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THE RECORDING AND REPORTING OF FLOATING ICE

BY TERENCE ARMSTRONG

[*MS. received* 23 *May 1958.*]

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Introduction

The need to record and report the distribution of floating ice has arisen wherever ships have been required to sail regularly in ice-filled waters. Various systems have been developed to meet the needs of particular areas, but these have grown up largely independently of each other. Such systems are generally designed to fulfil either, or both, of two purposes. One is the immediate end of providing material for a synoptic ice map, which is the basis of help to ships in the form of statements of the present whereabouts of the ice or predictions of its movements for a short period ahead. The other is a longer-term end, such as ice probability study, which seeks to utilize past records over as many years as possible in order to ascertain, in general terms, the probability of access to a given place at a given time; a result of such a study may be, for example, an ice atlas, of which two,[1, 2] covering wide areas, have appeared since the Second World War. Another long-term end is use of the ice pattern as an index of climatic change. Both lines of ice study require detailed information on the state of the ice, but each puts it to a different use. The problem, then, consists of devising a means of recording on paper, either photographically, cartographically, by means of explanatory text, or in some form of code convenient for radio transmission, the relevant facts about the distribution and behaviour of an area of floating ice, and also of reporting these in comprehensible terms, first to a collecting centre, and then to the users. In recent years a determined attempt has been made to obtain international agreement on a system for world-wide use. In order to understand the background, it may be useful to summarize the historical development of the problem. This is best done, not by a strictly chronological approach, but by tracing progress in each of the main areas concerned.

Baltic

This was the first region for which regular ice reports were made. In Finland, the Baltic country most severely affected by sea ice, regular observations were started in 1846 from points on shore, often lighthouses, and the information was passed on in the form of a simple message. The number of reporting stations increased steadily, particularly after winter shipping became established in 1877. Later, ships were brought into the reporting system, and, in about 1920, aircraft (the ships and aircraft were rarely employed specially to obtain ice information, but did so in the course of their other functions). Since 1914 a map illustrating the ice situation has been published, at first weekly and then twice a week. After the First World War, radio was introduced both for circulating ice reports to ships and for collecting incoming reports from ships and aircraft. Since 1918 the centre for this work has been Havsforskningsinstitutet, Helsingfors,[3] where the accumulating data on each winter's ice, now amounting to over forty years, has also been extremely useful in ice probability studies. The first detailed work on these lines was by Jurva,[4] and it has been continued and amplified by Palosuo.[5]

Sweden started systematic observations from shore stations in 1870, and formally set up an ice service ten years later. The service expanded its operations, circulated an ice bulletin, and in due course made use of radio communications. Only from 1957, however, have maps of ice conditions been made available to users. Since 1929 Sveriges Meteorologiska och Hydrologiska Institut, Stockholm, has been the organizing centre.[6] A similar pattern was followed by Denmark[7] and Germany,[8] where regular observations started in the 1890's. In Denmark the service is now run by Statens Istjeneste, København, and in Germany by Deutsches Hydrographisches Institut, Hamburg. In Russia, too, the development was similar, and the organization which became responsible for the service provided was the Leningrad branch of Gosudarstvennyy Okeanograficheskiy Institut [State Oceanographical Institute]. Exchange of information with the other Baltic countries, however, ceased some years after the revolution and was not renewed until 1956.

The fact that the Baltic countries all face the same problem, if in different degrees, has made for co-operation between them. For instance, when Germany found it convenient after the First World War to send ice messages in numerical code, the other interested countries agreed at the Fifth Baltic Hydrological Conference in 1936 to use the same code. This was amended, by agreement, in 1954. Again, in 1956, Denmark, Finland, Germany, Norway and Sweden agreed to use the same conventional signs on their ice maps, and this decision is now being implemented.

Thus, in the Baltic generally, the system grew from the simplest messages indicating conditions at particular points to the daily publication of maps showing the whole picture and accompanied by frequent radio reports. This progress has been much facilitated by the co-operation of the countries concerned, and has always been prompted by commercial considerations. It should be remembered, however, that the Baltic presents a comparatively simple form of the whole problem, since all the floating ice disappears every year, and is therefore all under six months old and broadly of the same type.

North Atlantic waters

After the Baltic, the North Atlantic is the region where shipping routes pass closest to ice. Dansk Meteorologisk Institut, København, started collecting ice information from ships in this area in 1872. As a result, this Institute was designated the international collecting centre for the North Atlantic by the Seventh International Geographical Congress in 1899, and since 1900 an annual report[9] has been produced showing by maps and explanatory text the position of the ice for each summer month. The method of presenting the information has been kept the same, so that each year is directly comparable with the others, but the area covered has gradually grown to include the whole northern hemisphere (although since 1939 there has been virtually no information on Soviet Arctic waters). This valuable accumulation of data has long been the main source of information from the point of view of climatological and ice probability studies, but it has never been designed for synoptic use. Since 1927, however, the Institute has also organized a radio ice reporting service for Greenland waters as a more direct aid to shipping.[10] Most of the information still comes from ships, but shore stations, and increasingly, aircraft, play a part. For instance, aircrews on Scandinavian Airlines System trans-polar flights since 1957 contribute by reporting on the position of the ice edge between Greenland and Svalbard, and supporting these observations with photography of critical areas.[11]

Norsk Polarinstitutt, Oslo and Veðurstofa Islands, Reykjavík, also organize the collection of ice information which they pass on to Dansk Meteorologisk Institut, the former from Norwegian ships in Greenland and Svalbard waters, the latter from Icelandic ships. This information is used in the annual reports. Historically, probably more is known about sea ice round Iceland than any other area, since there is available a series of observations going back to 1781.[12,13]

The International Ice Patrol was established in 1914 as a result of the *Titanic* disaster. Since that time the United States Coast Guard, acting as the agent of countries concerned in North Atlantic navigation, maintains watch for icebergs and pack ice in the Newfoundland–Greenland area each spring and early summer. Observation was formerly from Coast Guard cutters, but these have largely been replaced by aircraft. The emphasis is strongly on icebergs, as the greatest threat to shipping in these waters. Ice messages are broadcast to ships, and an annual report[14] on the state of the ice is issued. Thus both immediate and long-term needs are met.

In the North Atlantic, therefore, ice reporting systems for synoptic purposes exist in only two relatively small areas. Accumulation of data for longer-term purposes is on the basis of more or less haphazard collection, for the reason, of course, that there is not yet any special demand for more accurate results involving more systematic observation.

North Russian waters

Ice information was first collected on a regular basis in the White Sea, starting in 1893 or perhaps earlier, and the system was very similar to that used on Russia's Baltic coast. The sea areas to the east of Novaya Zemlya were not included until the First World War, when some shore stations were set up in the south-west part of the Kara Sea. The number of stations and of reporting ships grew rapidly in the 1930s in connexion with the development of the Northern Sea Route, and covered the whole area from the Barents Sea to Bering Strait. But the major development was large-scale use of aircraft employed specially for this purpose, reaching in the late 1930s a level of coverage permitting the drawing of a near-synoptic map of the whole Northern Sea Route area every ten days in the summer and at longer intervals throughout the year.[15] The amount of detail required on the nature and distribution of the ice greatly increased as more was learnt about its behaviour, so an intricate method of cartographic recording was devised for the use of observers, and a particular way of drafting plain language messages to users was developed. A special feature of the cartographic recording is the differentiation between summer and winter, a separate set of symbols being provided for each, in order to permit emphasis to be placed on different aspects of the ice situation. The synoptic information was used as the basis for reports and forecasts sent out by radio, but the maps are apparently not given more than limited local circulation. The original records are preserved at Arkticheskiy Nauchno-Issledovatel'skiy Institut [Arctic Research Institute], Leningrad (the centre for all Arctic sea ice work), where they are available for probability and climatological studies. These studies are certainly undertaken, but are not published. Apart from the two ice atlases already mentioned,[1,2] the only available work of this sort for the area was compiled in this country from published sources.[16]

The Soviet system is undoubtedly the most highly developed of any in the world, and therefore demands the highest level of training in those who operate it. It places heavy reliance on plain language messages, little on circulation of maps and none on numerical codes.

Waters north of Japan

As in the Baltic, the ice problem north of Japan concerns the winter months only. Although these waters (northern Japan Sea and southern Okhotsk Sea) are of close interest to the Russians as well as the Japanese, it is the Japanese who have been chiefly concerned with ice reporting, no doubt because it is their fishery interests which are principally involved. Regular shore station observations started in 1892, with ships included in 1902, and aircraft, at first on a very small scale, in 1935. The service came to be jointly run by the Maritime Safety Board and the Japanese Meteorological Agency. Reporting systems are becoming standardized, with use of numerical codes by shore stations (which are still the most important source) in their reports to the centre. Messages to users are in plain language, and no maps are circulated.[17]

American Arctic waters

Systematic reporting of ice data on any scale in this area did not start until 1950, when United States and Canadian ships started to enter the area in some numbers to set up and supply weather stations and air bases. The service has been almost entirely the responsibility of the U.S. Navy Hydrographic Office. It was possible to concentrate from the start on air reconnaissance, in this case mainly by U.S. Navy aircraft rather than shore station or ship observations. By 1954 the area covered included the whole of the American Arctic from the Labrador coast to the Bering Sea. A much simpler method of cartographic recording than the Soviet one has been adopted, and numerical codes have been largely avoided. The major contribution has been the wide use made of radio facsimile transmission of synoptic ice maps to users, in an effort to avoid total dependence upon lengthy plain language messages,[18] and this has proved successful. An ice probability study, incorporating the air reconnaissance data and using a method of presentation involving a minimum of interpolation, is in hand for the Canadian Defence Research Board.[19]

Antarctic waters

Ice observations have been made from time to time by ships, particularly those of the Discovery Committee. Regular collection of data has been undertaken by two organizations. One is the Falkland Islands Dependencies Survey, whose stations started reporting ice in 1945. There is no regular dissemination of synoptic ice information or publication of reports, but information is sent to approved ships visiting the area. The other is the United States Operation "Deep Freeze", whose task has been to establish and maintain United States I.G.Y. stations. Starting with the 1955–56 season, ice observations have been made and maps published.[20, 21] The system used is identical with that used in the American Arctic, but the amount of air reconnaissance is very much less. Development of radio reporting of ice from ships in the Southern Ocean has been retarded by the desire of the competing whaling companies not to disclose the position of their fleets. Thus in the Antarctic systematic ice reporting is in its infancy. A pioneer ice probability study on the position of the ice edge in the Southern Ocean was published in 1940,[22] and a more detailed one is in course of preparation for the waters of the Falkland Islands Dependencies.

Conclusion

The six examples considered above have significant points of difference from each other. These differences spring mainly from the experience, facilities and motives of the operating country, and only to a comparatively small degree from the nature of the area and of the ice in it. There ought therefore to be a good possibility of agreeing an international usage; the main difficulty is likely to be persuading each group to give up its vested interest in any existing system. At present an abbreviated list of terms, with their definitions, has been agreed internationally, although it has not yet been put into general use.[23]

Discussions are proceeding in the Commission for Maritime Meteorology of the World Meteorological Organization on the subject of a code, by which ice data expressed in the agreed terms could be exchanged internationally by radio, in the same way as meteorological data are exchanged now. This would certainly be helpful, although it is doubtful if codes alone will ever convey a fully adequate picture of a complex ice situation. A next step after this might be to agree on conventional signs to be used on maps. If all these agreements can be achieved and implemented—which is much more difficult than it sounds—there should be little difficulty in the various co-ordinating centres interpreting data exchanged among themselves, with corresponding benefit to the ultimate users.

Meanwhile there is likely to be development in the techniques of recording and reporting. The United States, use of facsimile reproduction is a clear advance, which one must expect to be adopted elsewhere, whenever the expense can be justified. In Japan and the United States thought is being given to ways in which air photography can help; but here it is worth noting that the Russians, with their great experience, make little use of it. But it is of course very likely that advances in technology will permit the development of quite new methods along lines which cannot now be foreseen. For the present, a pooling of ideas is obviously desirable, and each of the areas would probably gain from a close study of the methods used in the others.

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CHRONOLOGICAL LIST OF ANTARCTIC EXPEDITIONS

BY BRIAN ROBERTS

[Continued from *Polar Record*, Vol. 9, No. 59, 1958, p. 134]

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1898–1900	British expedition	C. E. Borchgrevink Bernhard Jensen	 *Southern Cross*
	Examined a large stretch of coast of Victoria Land; wintered at Cape Adare, the first scientific party to do so intentionally on the Antarctic continent; examined Ross Ice Front; sighted Balleny Islands; visited Macquarie Island. Scientific investigations included zoology, geology, meteorology and terrestrial magnetism		
1900	Letters Patent issued by Queen Victoria on 29 October, constituting the office of Governor of Tasmania, included Macquarie Island as a Dependency of Tasmania		
1901	[British?] voyage	Capt. Douglas	*Damascus*
	Visited Iles Crozet to search for castaways		
1901–03	German Antarctic Expedition	Erich von Drygalski Hans Ruser ? ?	 *Gauss* *Tanglin* *Stassfurt*
	Gauss was the second vessel to winter in the Antarctic pack ice; discovered Kaiser Wilhelm II Land; visited Iles Crozet and Heard Island. Separate scientific party spent 16 months at Iles de Kerguelen, 1902–03, conveyed by the *Tanglin* and taken off by the *Stassfurt*		
901–04	Swedish South Polar Expedition	Otto Nordenskjöld Carl Anton Larsen	 *Antarctic*
	Shore party wintered at Snow Hill Island; proved d'Urville's "Louis Philippe Land" (now Trinity Peninsula) to be part of Graham Land, and mapped unknown gap between Gerlache Strait and Orléans Channel; discovered and mapped Crown Prince Gustav Channel; sledged to lat. 66° S. on the east side of Graham Land; *Antarctic* wintered at South Georgia in 1902; three men were landed at Hope Bay to proceed overland to Snow Hill Island, but failed to reach it, so were forced to winter at Hope Bay in 1903; *Antarctic* was crushed in pack ice of Erebus and Terror Gulf and crew wintered at Paulet Island in 1903; all three parties were rescued from Snow Hill Island by Argentine vessel *Uruguay*; comprehensive scientific programme		
901–04	British National Antarctic Expedition	R. F. Scott	*Discovery*
	The first extensive exploration on land in Antarctica; a sledge party reached lat. 77° 59′ S.; examined coast of Victoria Land and Ross Ice Front; discovered King Edward VII Land; wintered at Hut Point, Ross Island; in 1902–03 *Discovery* remained ice-bound in McMurdo Sound, where she was visited by the *Morning*; *Discovery* was freed in February 1904, after arrival of the *Morning* and *Terra Nova*; visited Balleny Islands and Macquarie Island; comprehensive scientific programme		
902–03	British relief expedition	W. Colbeck	*Morning*
	Carried stores to *Discovery* in McMurdo Sound; discovered Scott Island		

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1902–04	Scottish National Antarctic Expedition	William S. Bruce Thomas Robertson	*Scotic*
	First oceanographical exploration of Weddell Sea; discovered northern par of Caird Coast, but no landing possible; wintered on Laurie Island, Sout Orkney Islands, which was charted; entrusted further operation of meteoro logical station on Laurie Island to Oficina Meteorologica Argentina in Februar 1904; comprehensive scientific programme		
1903	Argentine relief expedition[1]	Julián Irízar	*Urugua*
	Examined South Shetland Islands and rescued crew of *Antarctic* from Sno Hill Island		
1903–04	Swedish relief expedition	O. Gyldén	*Frithio*
	Sailed to rescue Nordenskjöld; reached Snow Hill Island to discover tha wintering party there and at Hope Bay, and crew of *Antarctic*, had already bee rescued by *Uruguay*		
1903–04	British relief expedition	W. Colbeck H. Mackay	*Mornin* *Terra Nov*
	Joined *Discovery* in McMurdo Sound to assist in bringing home Scott' expedition		
1903–05	French Antarctic Expedition	J.-B. Charcot	*Françai*
	Wintered at Booth Island off west Graham Land; charted west side of Palme Archipelago; discovered and roughly charted Loubet Coast southwards t Adelaide Island; sighted Alexander Land; comprehensive scientific programm		
1904–05	Norwegian–Argentine whaling expedition	Carl Anton Larsen (Manager) ? ? ? ?	 *Fortun* *Luis* *Rol* *Guardia Naciona*
	Cia. Argentina de Pesca of Buenos Aires established the first whaling statio in South Georgia, at Grytviken; Erik Sörling of Naturhistoriska Riksmuseum Stockholm, made biological observations and collected specimens		
1904–05	Argentine expedition	I. F. Galindez	*Urugua*
	Relieved meteorological station on Laurie Island, South Orkney Islands returning via South Shetland Islands and Gerlache Strait. Since 1904 th Argentine Government has sent an annual relief expedition to Laurie Island		
1905–06	Norwegian whaling expedition	Alexander Lange (Manager)	*Admirale*
	First modern floating factory, with two catchers, *Hauken* and *Ørnen*, visite South Shetland Islands, operating from Admiralty Bay, King George Island		
1905–06	Argentine expedition	Lorenzo Saborido	*Austral*
	First annual relief expedition to meteorological station on Laurie Island South Orkney Islands[3]		

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[1] On return of this expedition to Buenos Aires, Capt. C. A. Larsen aroused interest i possibilities of whaling at South Georgia, and Cia. Argentina de Pesca was formed wit Argentine capital.

[2] *Austral* was wrecked on coast of Uruguay in December 1907 shortly after sailing fro Buenos Aires with a party of meteorologists who were to have established an observator on Booth Island off Graham Coast; all passengers saved by *Amazone*.

[3] Subsequent annual relief expeditions are not listed here.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1905–06	British-Chilean expedition (from Punta Arenas)	Ernest Swinhoe (Manager)	*Consort*
	South Georgia Exploration Company, operating under British licence granted on 24 July 1905, attempted unsuccessfully to shart sheep farming at South Georgia		
1906	Norwegian whaling expedition	Capt. Ree	*Catherine*
	Wrecked on Iles Crozet. Capt. Ree set out in one of the boats for Australia to fetch help and was picked up by a German ship. He arranged by cable from Australia for the *Ingerid* of Cape Town to fetch the remaining survivors, but they had already been rescued by the New Zealand-bound liner *Turakina*		
1906	British naval expedition	M. H. Hodges	H.M.S. *Sappho*
	Investigated situation at South Georgia in February, following initiation of whaling industry there. Charted approaches to Grytviken		
1906	Falkland Islands Government granted lease of land and licence for whaling station at Grytviken in South Georgia to Cia. Argentina de Pesca of Buenos Aires in March (the first of a long series of leases and licences to conserve whale stocks in the Falkland Islands Dependencies). The increase of whaling led the Falkland Islands Government to enact Ordinance No. 3 of 1906 (the first to control whaling in the territorial waters of the Dependencies)[1]		
1906	Norwegian whaling expedition	Capt. Castberg	*Fridtjof Nansen*
	Wrecked in South Georgia on 10 November. A. Szielasko, medical officer, published geographical and ornithological observations		
1906	South African sealing expedition (from Cape Town)	Carl Olsen	*Victoria*
	The first steam sealer to work Prince Edward Islands		
1907	Meteorological observatory established by Oficina Meteorologica Argentina at Grytviken, South Georgia, under terms of British land lease to Cia. Argentina de Pesca. Maintained until transferred to Falkland Islands and Dependencies Meteorological Service in 1950 (*q.v.*)		
1907–08	Dr Svindal, who accompanied a Norwegian whaling expedition, collected invertebrates on Iles Crozet		
1907–09	British Antarctic Expedition	E. H. Shackleton	
		Rupert England (1907–08) John K. Davis (1908–09)	*Nimrod*
	Wintered at Cape Royds on Ross Island; sledged to within 97 miles of South Pole, discovering nearly 500 miles of new mountain ranges flanking Ross Ice Shelf; Professor David reached South Magnetic Pole area and took possession of Victoria Land at Magnetic Pole on 16 January 1909 and at Cape Bernacchi on 17 October 1908; Shackleton took possession of Polar Plateau for King Edward VII on 9 January 1909; visited Macquarie Island		

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[1] For subsequent legislation to control whaling and sealing industries, and to protect other forms of wild life in this region see *The laws of the Colony of the Falkland Islands and its Dependencies....* 2 vols. (London, 1951). For early whaling leases and licences in the Dependencies see *Report of the Interdepartmental Committee on Research and Development in the Dependencies of the Falkland Islands* [Cmd. 657]. (London, 1920.)

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1907–09	Swedish Magellan Expedition During this expedition C. Skottsberg and P. D. Quensel visited Sout Georgia in 1909 in the Cia. Argentina de Pesca's vessel *Cachalote*	Carl Skottsberg	—
1908	British Letters Patent of 21 July consolidated earlier territorial claim dating from 1775 onwards, as Dependencies of Falkland Islands, an specified principal territories included (South Georgia, South Orkne Islands, South Shetland Islands, South Sandwich Islands and Graha Land)		
1908	Prince Edward Islands annexed by British Government		
1908	Norwegian sealing expedition (from Christiania) Wrecked on Marion Island on 16 October; rescued a month later by Nov Scotian schooners *Agnes G. Donohue* and *Beatrice L. Corcom* which took th crew of seventy to Durban	Capt. Ree	*Solglim*
1908	Norwegian expedition Reconnaissance of South Georgia and South Sandwich Islands in search o new anchorages for whaling vessels; concluded that whaling could not be base on South Sandwich Islands	Carl Anton Larsen	*Undin*
1908–09	Franco-Norwegian expedition	Henri E. Bossière ? ? ?	 *Jeanne d'Ar* *Éclai* *Étoil*
	Established whaling and sealing station at Port Jeanne d'Arc, Iles d Kerguelen, in November 1908. The station was occupied intermittently unti 1914 and again from 1921 until 1929		
1908–10	French expedition Examined eastern parts of Iles de Kerguelen in detail	R. Rallier du Baty	*J.-B. Charco*
1908–10	French Antarctic Expedition Wintered at Petermann Island off west Graham Land; charted coast an islands southwards to Adelaide Island and Alexander Land; discovere Marguerite Bay, Fallières Coast and "Charcot Land" (since proved to be a island); sighted Peter I Øy; comprehensive scientific programme	J.-B. Charcot	*Pourquoi Pas*
1909	First British resident Stipendiary Magistrate sent to South Georgia		
1909	South African sealing expedition (from Cape Town) Visited Prince Edward Islands	Carl Olsen	*Victori*
1909–11	French expedition Visited whaling and sealing station at Port Jeanne d'Arc, Iles de Kerguelen the expedition was sent out by MM. René and Henri Bossière. Capt. Rin surveyed south and west coasts of the islands	Theodore Ring	*Jeanne d'Ar*
1910	Controlled sealing in South Georgia started by Cia. Argentina de Pesc under British regulations designed to conserve stocks of Elephant Seal		

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1910	British Government granted first licence to Sandefjord Whaling Co.[1] to occupy and exploit Heard Island		
1910	Anglo-Norwegian sealing expedition (from Durban)	Anton Evensen	*Mangaro*
	Captain hoisted British flag on Heard Island on 25 March		
1910	British search expedition	Capt. Owen	*Sabine*
	Searched Iles Crozet for survivors of missing British passenger liner *Waratah*, which had disappeared without trace in July 1909. Lieut. K. A. Beattie, R.N., and five naval ratings were lent by the Admiralty for this purpose		
1910	British search expedition	?	*Wakefield*
	Visited Prince Edward Islands, Iles Crozet, Heard Island and Iles de Kerguelen in search for survivors of missing passenger liner *Waratah*. Lieut. H. W. T. R. Seymour and four naval ratings were lent by the Admiralty; obtained much useful hydrographic information		
1910–11	First British Stipendiary Magistrate sent to Deception Island, South Shetland Islands; resident each summer whaling season until 1931, when shore station abandoned		
1910–12	German South Polar Expedition	Wilhelm Filchner Richard Vahsel Alfred Kling [2]	*Deutschland*
	Visited South Georgia and South Sandwich Islands, making new chart of former; discovered Luitpold Coast and charted part of south coast of Weddell Sea; discovered Filchner Ice Shelf; *Deutschland* was beset and drifted in pack ice for nine months; a winter sledge journey over drifting pack ice proved non-existence of Morrell's "New South Greenland" reported in 1823		
1910–12	Norwegian Antarctic Expedition	Roald Amundsen Thorvald Nilsen	*Fram*
	Wintered at Bay of Whales, Ross Ice Shelf; five men reached the South Pole on 14 December 1911; discovered Queen Maud Range; K. Prestrud explored King Edward VII Land and took possession for King Haakon VII on 7 December 1911; reported "Carmen Land", the existence of which has since been disproved. During winter 1911 *Fram* made oceanographical observations in South Atlantic		
1910–13	British Antarctic Expedition	R. F. Scott H. Pennell	*Terra Nova*
	Wintered at Cape Evans on Ross Island; five men reached South Pole on 17 January 1912, but all perished during return journey; extensive explorations and scientific investigations (biology, geology, glaciology, meteorology, geophysics) along coast of Victoria Land and on Ross Ice Shelf; separate parties wintered at Cape Adare and Evans Cove; discovered Oates Land		
1911–12	Japanese South Polar expedition	Choku Shirase N. Nomura	*Kainan Maru*
	Sledged some miles south-east across Ross Ice Shelf from Bay of Whales; landed on King Edward VII Land		

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[1] This company made a private agreement with South African Whaling Co. of Durban to share the licence if latter company undertook to send a reconnaissance expedition to the island (see *Mangaro*).

[2] Kapt. Vahsel died on 8 August 1912; succeeded by Kapt. Kling.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1911–12	Norwegian whaling expedition Investigated anchorages in South Sandwich Islands and South Orkney Islands for Rethval Whaling Co. of Oslo	Petter Sörlle	*Paal*
1911–12	Norwegian whaling expedition Searched for suitable anchorages for whale factory ships in South Shetland and South Orkney Islands; whaling based on South Orkney Islands was started under British licence in 1911; first experimental whaling expedition to South Sandwich Islands	Ole Jörgensen	*Thulla*
1911–12	David Ferguson (British) carried out geological investigations in South Georgia for Chr. Salvesen and Co.		
1911–14	Australasian Antarctic Expedition Discovered and explored King George V Land and Queen Mary Land, which were claimed for British Crown at Cape Denison in March 1912 and at Possession Rocks on 25 December 1912; shore parties wintered at Cape Denison and on the Shackleton Ice Shelf; explored Terre Adélie and sledged to South Magnetic Pole area; extensive scientific investigations; a separate party, under G. F. Ainsworth, spent 23 months on Macquarie Island and made the first detailed scientific investigations there and mapped the island	Douglas Mawson John K. Davis	 *Aurora*
1912	Norwegian shore whaling station of Hektor Whaling Co. at Deception Island, South Shetland Islands, started operations under British licence in December; maintained continuously until 1931		
1912	Compagnie Générale des Iles Kerguelen, Saint Paul et Amsterdam founded under management of René Bossière. This company undertook profitable whaling and sealing operations at Iles de Kerguelen, interrupted by the war of 1914, but resumed in 1921 (*q.v.*)		
1912–13	United States whaling and sealing expedition (from New Bedford) Visited South Georgia; R. C. Murphy made ornithological observations and collections for the American Museum of Natural History, New York, and a sketch map of Bay of Isles	Benjamin D. Cleveland	*Daisy*
1912–13	Norwegian whaling expedition Made surveys in South Orkney Islands	Petter Sörlle	*Paal*
1912–13	South African sealing expedition (from Cape Town) Wrecked on Prince Edward Island on 22 October 1912. All but two of crew survived winter on Prince Edward Island and Marion Island and were rescued by Cape Town sealer *T.W. 1* on 14 April 1913	Capt. Hystad	*Sea Bird*
1912–14	French expedition Hydrographic survey of Iles de Kerguelen; J. Loranchet made ornithological observations	R. Rallier du Baty	*Curieuse*
1913	Norwegian whaling expedition Surveyed west coast of Signy Island, South Orkney Islands	M. T. Moe	*Tioga*
1913	French hydrographic expedition Surveyed anchorages and revised sailing directions in Iles de Kerguelen	Capt. Allaire	*Yves de Kerguelen*

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1913	G. E. H. Barrett-Hamilton (British) visited South Georgia on behalf of Colonial Office to investigate state of whaling industry and biology of whales		
1913–14	Norwegian whaling expedition	Hans Borge	*Polynesia*
	Recharted Borge Bay, Signy Island, a whaling anchorage in South Orkney Islands		
1913–14	David Ferguson (British) carried out a geological reconnaissance, from the whale-catcher *Hanka*, of South Shetland Islands, Palmer Archipelago and Danco Coast		
1913–15	Commonwealth Meteorological Expedition	H. Power[1] (1913–14) A. C. Tulloch[1] (1914–15) ?	*Endeavour*
	Meteorological station maintained on Macquarie Island by Commonwealth Meteorological Bureau, continuing work of Australasian Antarctic Expedition in 1911–14. The *Endeavour* disappeared without trace after relieving the station on 3 December 1914		
1914	J. G. Correia collected bird skins at South Georgia for American Museum of Natural History		
1914–16	British Imperial Trans-Antarctic Expedition	Sir Ernest Shackleton Frank A. Worsley	*Endurance*
	Visited South Sandwich Islands; discovered southern part of Caird Coast; *Endurance* was beset, drifted for ten months, and was crushed in pack ice of Weddell Sea, wrecking plan to sledge across Antarctic continent; crew escaped in boats to Elephant Island, South Shetland Islands; Shackleton sailed 800 miles to South Georgia in whale boat *James Caird*, made the first crossing of the island, and organized four relief expeditions in 1916 (*see below*), of which the last rescued the party on Elephant Island		
914–17	Shackleton's Ross Sea Party	A. E. Mackintosh J. R. Stenhouse	*Aurora*
	Transported Ross Sea Party of Shackleton's Imperial Trans-Antarctic Expedition. In May 1915 the *Aurora* was driven from her moorings at Cape Evans, leaving ten members ashore, who wintered at Cape Evans on Ross Island and laid depots southwards to Beardmore Glacier for Shackleton's proposed trans-Antarctic journey (*see above*). *Aurora* was beset and drifted for nine months in Ross Sea pack ice; visited Macquarie Island to provision Commonwealth Meteorological Expedition party		
915–16	United States expedition	W. J. Peters	*Carnegie* (4th cruise)
	Sub-Antarctic circumnavigation carrying out magnetic researches; visited South Georgia; attempted, without success, to land on Bouvetøya		
916	British (first) relief expedition (from South Georgia)	Sir Ernest Shackleton Capt. Thom	*Southern Sky*
	Failed to reach Elephant Island in May 1916		
916	Uruguyan (second) relief expedition (from Montevideo)	Sir Ernest Shackleton Lieut. Ryan	*Instituto de Pesca I*
	Failed to reach Elephant Island in June 1916		

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[1] Leader of wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1916	British (third) relief expedition (from Punta Arenas) Failed to reach Elephant Island in July 1916	Sir Ernest Shackleton	*Emm*
1916	Chilean (fourth) relief expedition (from Punta Arenas) Rescued the crew of the *Endurance* from Elephant Island in August 1916	Sir Ernest Shackleton Luis Pardo	*Yelc*
1916–17	Ross Sea relief expedition Rescued surviving members of Shackleton's Ross Sea party from Cape Eva in January 1917	John K. Davis	*Auro*
1916–17	J. Innes Wilson (British) accompanied whaling fleet to South Shetlan Islands, Palmer Archipelago and Trinity Island; collected geologic specimens for Falkland Islands Government		
1917	British Letters Patent of 28 March amended 1908 definition of Falklan Islands Dependencies to clarify extent of Antarctic mainland include (sector between longs. 20° and 80° W.), together with specified islan groups		
1917	British Colonial Office set up Interdepartmental Committee on Researc and Development in the Dependencies of the Falkland Islands to consider action to preserve whaling industry and to promote scientific investigations in the Antarctic. The Committee's work led to appointmen of Discovery Committee in 1923, and research work in the Antarct was started in 1925		
1920	British expedition Charted Cumberland Bay while "showing the flag" at South Georgi charted Shag Rocks	H. W. W. Hope	H.M.S. *Dartmou*
1920–21	Norwegian shore whaling station on Signy Island, South Orkney Island started operations early in 1921 under British licence		
1920–22	British expedition Four men were taken to South Shetland Islands by whaling vessels; th leader and H. G. Wilkins returned to England, but T. W. Bagshawe an M. C. Lester wintered at Waterboat Point on west coast of Graham Lan recording meteorological, tidal and zoological observations	J. L. Cope[1]	—
1921	Kerguelen Sealing and Whaling Company, a subsidiary of Irvin an Johnson (South Africa) Ltd., established at Cape Town with righ at Iles de Kerguelen accorded by the Compagnie Générale des Il Kerguelen, Saint Paul et Amsterdam		
1921–22	Shackleton–Rowett Antarctic expedition After death of Shackleton at South Georgia, attempts to discover new lan in Enderby Land area were unsuccessful; visited South Sandwich Islands an Elephant Island in South Shetland Islands	Sir Ernest Shackleton Frank Wild[2]	*Que*

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[1] Returned to England in March 1921.

[2] Frank Wild became leader after Shackleton's death on 5 January 1922.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
922 (?)	French whaling and sealing station, owned by Compagnie Générale des Iles Kerguelen, established at Port Couvreux, Iles de Kerguelen; continued operations until 1931		
922–23	French expedition	Etienne Peau	*Oural*
	Visited Iles de Kerguelen; primarily occupied with biological investigations		
923	British Order in Council of 30 July established Ross Dependency (sector between longs. 160° E. and 150° W.) under administration of New Zealand Government. Subsequent regulations for the Dependency (especially relating to whaling in territorial waters) were promulgated on 14 November 1923, 23 October and 1 November 1926 and 24 October 1929		
923	A. Carcelles (Argentine) made biological collections in South Georgia for Museo Nacional de Buenos Aires		
923–24	Norwegian whaling expedition	Carl Anton Larsen (Manager)	*Sir James Clark Ross* and five catchers
	First whaling in Ross Sea, based on Discovery Inlet (December 1923 to March 1924); examined possibilities of using Bay of Whales, McMurdo Sound, Franklin Island and coast of Victoria Land as bases for whaling fleet		
924	French Government Decree of 27 March reserved mining, hunting and fishing rights in Terre Adélie (boundaries subsequently fixed by Decree of 1 April 1938) and Iles Crozet. Further French Decrees of 2 April and 21 November consolidated earlier claims to Iles Crozet, Iles de Kerguelen, Ile Saint-Paul, Ile Amsterdam and Terre Adélie, and provided for their administration as Dependencies of Madagascar. French Decree of 30 December regulated whaling and sealing in these regions and proclaimed all but specified parts of Iles de Kerguelen a "National Park", with protection for wild life		
924	Falkland Islands Ordinance No. 6 of 24 December established Dependencies Research and Development Fund to ensure that revenues derived from whaling leases and licences and other local taxes be devoted to research in connexion with the whaling industry		
924–25	Norwegian whaling expedition	Carl Anton Larsen[1] (Manager)	*Sir James Clark Ross* and five catchers
	Second expedition to Ross Sea		
925	Discovery Committee's marine biological laboratory at Grytviken, South Georgia, completed in January; work in this laboratory started under N. A. Mackintosh, continued, with periodic changes of staff, during each whaling season until 1931		
925	The Société des Pêches Australes, a French subsidiary of the Compagnie Générale des Iles Kerguelen, founded to conduct controlled sealing operations in the northern parts of Iles de Kerguelen		

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[1] Died at sea on 8 December 1924.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1925	Argentine Government first formulated claims to South Orkney Island extended in 1927 to South Georgia and in 1937 to *all* of the territori in the Falkland Islands Dependencies		
1925–26	Norwegian whaling expedition	?	*Lanci*
	Capt. H. G. Melsom installed the first hauling-up slipway on this vess which inaugurated pelagic whaling in the Antarctic; *Lancing* visited Sou Georgia, South Orkney Islands, South Shetland Islands and Palmer Arcl pelago		
1925–27	Discovery Investigations	S. Kemp J. R. Stenhouse	*Discove*
	Preliminary oceanographical survey of South Georgia and South Shetla Islands whaling grounds; hydrographic surveys were made in these two grou and in Palmer Archipelago; six lines of oceanographical observations run b tween Cape Town and Scotia Sea and another between South Shetland Islan and Cabo de Hornos; sighted Bouvetøya; visited South Orkney Islands		
1925–27	German Atlantic Expedition	A. Merz[1] F. Spiesz	*Mete*
	Oceanographical cruise including hydrographic observations at Sou Georgia, South Shetland Islands and South Sandwich Trench; visited Bouv tøya		
1926	Published account of British Imperial Conference held in London October and November defined Antarctic areas to which a Britis inchoate title existed by virtue of discovery		
1926	Rights to exploit Heard Island and McDonald Islands were granted b United Kingdom Government on 9 October for ten years to Kerguele Sealing and Whaling Company, a subsidiary of Irvin and Johnsc (South Africa) Ltd. of Cape Town; lease terminated in 1934		
1926–27	French expedition	C. P. Dumaresq	*Ham*
	Coastal surveys of Iles de Kerguelen		
1926–27	Norwegian whaling expedition	S. Sjeldche	*Lanci*
	Visited South Georgia and South Orkney Islands. A. Carcelles mac further biological collections for Museo Nacional de Buenos Aires		
1926–27	Norwegian expedition	Eyvind Tofte A. S. Anderson	*Odd*
	Whaling reconnaissance in Bellingshausen Sea; visited and charted Peter Øy but unable to land; visited South Georgia, South Shetland Islands a Palmer Archipelago		
1926–27	Discovery Investigations	G. M. Mercer	R.R.S. *William Scores* (1st commissio
	Whale marking and oceanographical cruise off South Georgia; trawli survey off Falkland Islands		

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[1] Died at sea on 25 August 1925; F. Spiesz, in executive command of ship, continued sole command.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1927	French Government initiated efforts to control pelagic whaling by international agreement, without success		
1927	Norwegian whaling expedition	?	*Busen VII*
	A/S Tönsberg Hvalfangeri sent this catcher to make another search for a site for a shore whaling station in South Sandwich Islands		
1927–28	Norwegian whaling expedition	?	*Anglo-Norse*
	J. E. Hamilton, of Discovery Investigations, accompanied this expedition to South Sandwich Islands area to carry out marine biological work; no landing was made		
1927–28	French sealing expedition	? ?	*Arques* *Lozère*
	Both vessels were wrecked at Iles de Kerguelen in February 1928; crews were saved		
1927–28	Norwegian (Christensen) Antarctic expedition	Haakon Mosby Harald Horntvedt	*Norvegia* (1st voyage)
	The first of a series of expeditions promoted by Consul Lars Christensen; spent a month sealing, making scientific observations and surveying at Bouvetøya, which was claimed for Norway on 1 December 1927; oceanographical observations in waters round Bouvetøya; plan to establish meteorological station on this island abandoned owing to unfavourable conditions, but depot hut built; while repairs to *Norvegia* were being made at South Georgia, O. Holtedahl and O. Olstad visited South Shetland Islands and Palmer Archipelago, on board vessels principally belonging to Norwegian whaling fleet, to make geological and zoological investigations		
1927–28	Norwegian whaling expedition	?	*Scapa*
	This whale-catcher capsized off Laurie Island, South Orkney Islands, on 23 January 1928; only two of crew of seventeen survived		
1927–30	Discovery Investigations	D. D. John[1] J. W. S. Marr[2] G. W. Raynor[3] H. de G. Lamotte, R. L. V. Shannon[4]	R.R.S. *William Scoresby* (2nd commission)
	Oceanographical work between Falkland Islands, South Georgia and South Shetland Islands; some hydrographic charting in latter group in February to March 1929. In 1929–30 *William Scoresby* acted as base ship for Sir Hubert Wilkins's air reconnaissance of north-west Graham Land and Bellingshausen Sea (*see below*)		
1928	Norwegian Royal Decree of 23 January proclaimed sovereignty over Bouvetøya		
1928	British expedition	?	*Fleurus*
	Official visit in February to March of Sir Arnold Hodson, Governor of Falkland Islands, to South Shetland Islands, Palmer Archipelago, South Orkney Islands and South Georgia		

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[1] Chief scientist December 1927 to April 1929.
[2] Chief scientist April to June 1929.
[3] Chief scientist June 1929 to June 1930.
[4] In executive command of ship for different cruises.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1928–29	French expedition	E. Aubert de la Rüe	
		?	*Austr*
	Geological reconnaissance for economic minerals in Iles de Kerguelen an Heard Island; the latter visited in whale-catcher *Kildalkey* (Capt. Hanse in January 1929		
1928–29	Norwegian whaling expedition	Capt. Nilsen	*C. A. Larse*
	Operated in Ross Sea; E. H. Marshall, Surgeon to Discovery Investigations accompanied expedition and made observations on whales		
1928–29	Wilkins–Hearst Antarctic Expedition (British and United States)	Hubert Wilkins (1st expedition)	
		?	*Hektori*
	Original intention to fly from Graham Land to Ross Sea frustrated by ba weather; pioneer air reconnaissance, with assistance of Hektor Whaling Com pany, of east coast of Graham Land from Deception Island to about lat 71° 20′ S.; the furthest point sighted was named "Hearst Land" (now Hears Island); results suggested Graham Land to be an archipelago separated from the mainland by "Crane, Casey and Lurabee Channels" (now Crane, Casey and Lurabee Glaciers) and "Stefansson Strait" (now Stefansson Sound); th existence of the channels has since been disproved		
1928–29	Norwegian (Christensen) Antarctic expedition	Ola Olstad Nils Larsen	*Norvegi* (2nd voyage
	Landed on Bouvetøya; full equipment and staff to establish a meteorological station were taken out by *Thorshammer* and transferred to *Norvegia*, but n suitable site could be found on the island, and hut built in 1927 had been destroyed by gales; proved non-existence of "Thompson Island"; first landing on Peter I Øy, which was claimed for Norway on 2 February 1929; Peter I Øy was surveyed and a small hut built		
1928–29	Norwegian (Christensen) whaling expedition	?	*Thorshamme*
	Visited Bouvetøya		
1928–29	German expedition	L. Kohl-Larsen	—
	Surveyed parts of South Georgia, including inland glaciers, and made biological collections		
1928–30	United States Antarctic Expedition	Richard E. Byrd (1st expedition)	
		?	*City of New Yor*
		?	*Eleanor Bolling*
	Wintered at "Little America I", Bay of Whales, Ross Ice Shelf; flights eastwards over and beyond King Edward VII Land; discovered and examined Rockefeller Mountains; discovered Edsel Ford Ranges; Marie Byrd Land discovered and claimed for United States by L. Gould on 20 December 1929; a sledge party made a geological reconnaissance of Queen Maud Range, which was mapped from ground and air; Amundsen's "Carmen Land" found to be non-existent; first flight over South Pole on 29 November 1929; visited Scott Island		
1928–30	Hydrographic survey of harbours and anchorages in South Georgia carried out by J. M. Chaplin for Discovery Committee		

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1929	International Council for the Exploration of the Sea appointed a Whaling Committee to consider effects of developments in the industry on stock of whales. Economic Committee of League of Nations concluded that international measures for protection of whales were urgent. Norwegian Government took first practical steps to control pelagic whaling and established International Bureau of Whaling Statistics at Oslo		
1929	British search expedition	Charles Melling	*Deucalion*
	Visited Iles Crozet, Prince Edward Islands and Iles de Kerguelen in search for survivors of missing Danish training barque *København*, which had disappeared without trace in December 1928		
1929–30	Norwegian (Christensen) Antarctic expedition	Hjalmar Riiser-Larsen Nils Larsen	*Norvegia* (3rd voyage)
	Twice visited Bouvetøya, where a hut was erected and the whole island was photographed from the air; air reconnaissance of western Enderby Land; hoisted Norwegian flag on skerry near Cape Ann on 22 December 1929 (a claim subsequently not sustained by Norwegian Government); met *Discovery* near Cape Ann (*see below*); discovered and roughly charted from the air Kronprins Olav Kyst and Kronprinsesse Märtha Kyst		
1929–30	British expedition	Hubert Wilkins (2nd expedition) R. L. V. Shannon	R.R.S. *William Scoresby*[1] (2nd commission)
	Continuation of previous season's aim to fly from Falkland Islands Dependencies westwards along the mainland coast to Ross Sea; air reconnaissance of north-west Graham Land as far south as Leroux Bay and eastwards to Richthofen Pass; further flights appeared to confirm and extend erroneous discoveries of 1928; proved "Charcot Land" to be an island; no land sighted during flight over pack ice to lat. 73° S., long. 101° W. Charcot Island claimed for King George V on 29 December 1929		
1929–30	A. Carcelles (Argentine) made further biological collections in South Georgia for Museo Nacional de Buenos Aires		
1929–31	British, Australian, New Zealand Antarctic Research Expedition	Douglas Mawson John K. Davis (1929–30) K. N. Mackenzie (1930–31)	*Discovery*
	Discovered MacRobertson Land; visited Kemp and Enderby Lands, proving them to be connected; position of coastline from long. 45° E. to 75° E. roughly charted from ship and aircraft; met *Norvegia* near Cape Ann on 14 January 1930 when the leaders of the two expeditions agreed on long. 45° E. as the boundary line between British and Norwegian activities; visited Cape Denison in King George V Land; discovered Banzare Coast from the air; no land found in position of Balleny's landfall in 1839, but new "appearance of land" further west named Sabrina Coast; discovered Princess Elizabeth Land and roughly charted Mackenzie Bay from the air; landings on continent were made at Scullin Monolith and Cape Bruce in MacRobertson Land and at Proclamation Island in Enderby Land; formal proclamations annexing the Australian Antarctic Territory for King George V were read at five points; visited Iles Crozet, Iles de Kerguelen, Heard and Macquarie Islands		

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[1] The party and their aircraft were transported to Deception Island by Hektor Whaling ompany's transport *Melville* and returned in *Henrik Ibsen*. *William Scoresby* acted as ender for the flying operations.

Date — *Nationality, etc.* — *Leader or Commander* — *Ship*

1929–31 Discovery Investigations — S. Kemp
W. M. Carey — R.R.S. *Discovery I*
(1st commission

Oceanographical work, mainly in Falkland Islands Dependencies an especially in South Georgia whaling grounds, but observations extended t other parts of South Atlantic and Bellingshausen Sea; surveys made in Sout Sandwich Islands, South Shetland Islands, South Georgia and Bouvetøya confirmed non-existence of "Thompson Island"; visited Darbel Bay, wes Graham Land, and South Orkney Islands

1930 Norwegian Law of 27 February proclaimed sovereignty over Bouvetøya Norwegian Royal Resolution of 19 September provided for its admini-stration

1930 South African sealing expedition (from Cape Town) — ? — *Kildalke*

Sent to Prince Edward Islands by Messrs Irvin and Johnson to investigat possibilities of resuming sealing

1930–31 French expedition — Capt. Perot — *Antarè*

Visited Iles Crozet and Iles de Kerguelen to reassert French claims; fla hoisted on Ile aux Cochons and Ile de la Possession on 17 January 1931

1930–31 French expedition — E. Aubert de la Rüe
? — *Ile Saint-Pau*

Geological reconnaissance of Iles de Kerguelen for economic minerals

1930–31 Norwegian (Christensen) Antarctic expedition — Gunnar Isachsen
Hjalmar Riiser-Larsen[1]
Nils Larsen — *Norvegi*
(4th voyage

Antarctic circumnavigation; searched for mythical "Dougherty Island" an "Nimrod Island"; visited South Shetland Islands and Bouvetøya; flight southward resulted in discovery and rough charting of Prinsesse Ragnhil Kyst, which was claimed for Norway on 17 February 1931; air reconnaissanc of Kronprins Olav Kyst

1930–31[2] During this season the captains of a number of Norwegian whalin vessels confirmed or extended earlier discoveries: H. Halvorsen, o *Sevilla*, sighted land in the vicinity of long. 14° E. and named it "Prin-sesse Astrid Land" (now Prinsesse Astrid Kyst). Gustav Bull, o *Thorshammer*, sighted Prinsesse Ragnhild Kyst. On 12 January 193 Arnold Brunvoll, of *Seksern*, sighted land between longs. 64° E. an 66° 34′ E. Reidar Bjerkö, of *Bouvet II*, saw the same land on 19 Januar and he was followed the next day by Carl Sjövold of *Bouvet III*. Lan could be seen from this vessel as far west as long. 62° E. On 24 Januar *Bouvet III* again sighted land in lat. 68° S., long. 74° E. The land fro long. 65° E. to about long. 60° E. was also sighted by Rolf Walter o

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[1] Leaders for different cruises.

[2] All these discoveries occurred in rapid succession and were characteristic of this perio The chronology of the activities of Sir Douglas Mawson and of these Norwegian expeditio in Kemp and MacRobertson Lands, 1929–31, is set out in tabular form in the *Discove Reports* (Cambridge), Vol. 19, 1940, p. 179. A map showing these overlapping discoveri is published in the *Geographical Journal*, Vol. 94, No. 3, 1939, p. 272.

Date *Nationality, etc.* *Leader or Commander* *Ship*

Thorgaut. In February Lars Christensen, on *Thorshavn*, sighted Cape Darnley. Klarius Mikkelsen, of *Torlyn*, made landings at south end of Mackenzie Bay and at lat. 68° 10′ S., long. 69° E., naming the new territory "Lars Christensen Land" (now Lars Christensen Coast). Captain Daehli, of *Hilda Knudsen*, sighted land between longs. 60° E. and 58° E. O. Borchgrevink, of *Antarctic*, made sketch surveys of the coasts of Enderby Land and Kemp Land between longs. 59° E. and 51° 30′ E. and of Kronprins Olav Kyst

930–32 Discovery Investigations — E. R. Gunther; J. C. C. Irving, T. A. Jolliffe[1] — R.R.S. *William Scoresby* (3rd commission)

Oceanographical and whale-marking cruise round South Georgia and northern part of Weddell Sea; survey of Peru coastal current; trawling survey of Burdwood Bank

931 Norwegian Royal Proclamation of 31 May proclaimed sovereignty over Peter I Øy

931 International Convention for the Regulation of Whaling signed in September at Geneva by twenty-six nations (not including Argentina, Chile, Russia or Japan); became effective in June 1932. (This first experiment in international agreement fell far short of a satisfactory restriction)

931–32 Owing to over-production of whale oil and financial crisis of 1930–31, most of world's whaling fleets were laid up for season. While 47 expeditions with 232 catchers took part in 1930–31 Antarctic season, only 7 expeditions with 45 catchers took part in 1931–32. Whaling companies first made quota agreements to reduce total oil production

931–32 Discovery Investigations — D. D. John, W. M. Carey — R.R.S. *Discovery II* (2nd commission)

Oceanographical work; a series of long voyages, V- and W-shaped lines of observations between pack ice and ports in Falkland Islands, South Africa, Australia and New Zealand; the fourth circumnavigation of the Antarctic continent and the first during winter; many lines of closely grouped observations in waters of Falkland Islands Dependencies, including northern part of Weddell Sea; visited South Georgia, South Shetland Islands and South Orkney Islands, making surveys in the latter group

932–33 All Norwegian and all but one British whaling company formed a production cartel to minimize competition and avoid flooding world oil market by allocating quotas to each company; arrangements which were annually renewed (with variations) until 1937

932–33 Norwegian (Christensen) Antarctic expedition — Hjalmar Riiser-Larsen
? — *Thorshavn*
Gustav Bull (Manager) — *Thorshammer*
? — *Torlyn*

A sledging party, taken out in *Thorshavn* and transferred to *Thorshammer* and *Torlyn* aimed to sledge along the sea ice lying off the continent between Enderby Land and Weddell Sea; conditions were very unfavourable; the ice broke up two days after a start had been made in lat. 68° 45′ S., long. 33° 50′ E., and the party was rescued by whale-catcher *Globe V*

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[1] In executive command of ship for different cruises.

Date	Nationality, etc.	Leader or Commander	Ship
1933	British Order in Council of 7 February established Australian Antarct Territory (sector between longs. 45° E. and 160° E., excluding Frenc enclave of Terre Adélie), and provided for its administration by th Government of the Commonwealth of Australia. This came into forc by Proclamation of 24 August 1936 under Australian Antarctic Terr tory Acceptance Act of 13 June 1933		
1933	Norwegian Law of 24 March provided for administration of Peter I Øy		
1933	Lieutenant Governor of Tasmania proclaimed Macquarie Island sanctuary for wild life		
1933–34	Norwegian (Christensen) Antarctic expedition	Lars Christensen Klarius Mikkelsen	Thorshav
	Antarctic circumnavigation; flight made over Lars Christensen Coas MacRobertson Land; during further flights discovered "Prinsesse Astrid Land (now called King Leopold and Queen Astrid Coast, a part of Princess Elizabet Land) and ice shelf off Marie Byrd Land in lat. 73° S., long. 131° W.		
1933–34	United States expedition	Lincoln Ellsworth ?	*Wyatt Ear* (1st voyage
	Plan to fly across Antarctic continent from Ross Sea to Graham Lan frustrated by wreck of plane when landed on sea ice in Bay of Whales		
1933–35	United States Antarctic Expedition	Richard E. Byrd (2nd expedition) ROB[illegible] ? Lt.J.G. USN [illegible] ? [illegible]	*Bear of Oaklan* *Jacob Ruppe*
	Wintered at "Little America II", Bay of Whales, Ross Ice Shelf; the mos elaborate expedition base established in the Antarctic up to that time; te new buildings added to the 1929 base; eastern margin of Ross Ice Shelf roughl charted during sledge journeys to Edsel Ford Ranges, Rockefeller Plateau an eastern part of Queen Maud Range; geological party ascended Robert Sco Glacier to Polar Plateau; proved continental character of Marie Byrd Lan and that almost certainly no sea connexion exists between Ross Sea an Weddell Sea; flights showed that the newly discovered Rockefeller Platea probably extends from Edsel Ford Ranges to Queen Maud Range, but a sma gap between 83° S. and Horlick Mountains remained unexplored; surveys mad in Queen Maud Range, Alexandra and Rockefeller Mountains; named an roughly located trend of Ruppert Coast; extensive scientific programme i cluding seismic sounding of Ross Ice Shelf and Rockefeller Plateau to determi position of coastline; advance weather station 100 miles south of "Litt America II" occupied for seven months		
1933–35	Discovery Investigations	N. A. Mackintosh A. L. Nelson	R.R.S. *Discovery I* (3rd commissio
	Lines of oceanographical observations repeated at intervals in the meridi of 80° W. and in Scotia Sea for the study of seasonal variations; several lo voyages through Pacific and Atlantic sectors of Southern Ocean examini whale populations and their environment; visited Marion Island in the Prin Edward Islands, South Georgia, South Orkney Islands and South Shetla Islands, making surveys in the latter group		
1934	British expedition	E. R. G. R. Evans	H.M.S. *Milfo*
	Visited Bouvetøya but unable to land		

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1934–35	Japanese whaling fleet operated in Southern Ocean for first time		
1934–35	Norwegian (Christensen) Antarctic expedition	Klarius Mikkelsen	*Thorshavn*
	Discovered and landed on Ingrid Christensen Coast in Princess Elizabeth Land; surveys made in this area and Norwegian flag hoisted on 20 February 1935		
1934–35	Discovery Investigations	G. W. Raynor C. R. U. Boothby	R.R.S. *William Scoresby* (4th commission)
	Whale marking cruise, mainly in pelagic whaling grounds south of South Africa		
1934–35	United States expedition	Lincoln Ellsworth Capt. Holth	*Wyatt Earp* (2nd voyage)
	Plan to fly across Antarctic continent from Graham Land to Ross Sea frustrated by continuous bad weather; a short flight along the east coast of Trinity Peninsula was made from Snow Hill Island to Nordenskjöld Coast		
1934–37	British Graham Land Expedition	John Rymill R. E. D. Ryder	*Penola*
	Wintered at Argentine Islands and Debenham Islands in successive seasons; during sledge journeys and flights the coast and off-lying islands of west Graham Land were surveyed from Palmer Archipelago to southern Alexander Land. Sledging parties discovered and penetrated southwards down King George VI Sound to lat. 72° S., and eastwards across Graham Land, proving the channels reported by Wilkins in 1928–29 to be non-existent; extensive scientific programme including meteorology, geology, glaciology and biology		
1935	Norwegian Royal Resolution of 29 March prohibited sealing on Bouvetøya and Peter I Øy		
1935–36	Norwegian whaling research expedition	?	*J. H. Bull*[1]
	Whaling reconnaissance in Amundsen Sea		
1935–36	Discovery Investigations	G. W. Raynor C. R. U. Boothby	R.R.S. *William Scoresby* (5th commission)
	Whale-marking cruise in South Indian Ocean; examined and recharted coast of Mackenzie Bay and of MacRobertson and Kemp Lands west to long. 57° E.; discovered King Edward VIII Gulf; landed at Scullin Monolith in MacRobertson Land and in William Scoresby Bay, Kemp Land		
1935–36	Ellsworth trans-Antarctic flight (United States)	Lincoln Ellsworth Capt. Olsen	*Wyatt Earp* (3rd voyage)
	Piloted by H. Hollick-Kenyon, Lincoln Ellsworth made the first flight across the continent, from Dundee Island to Bay of Whales, in November 1935; reported discovery of "Eternity Range"; named "James W. Ellsworth Land" (now Ellsworth Highland) and claimed it for United States on 23 November; four landings were made during the crossing; in response to request for help, *Discovery II* was sent from Australia to Ross Sea to pick them up, transferring them four days later to *Wyatt Earp*		

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[1] *J. H. Bull* was built to replace the *Norvegia*, which was crushed in the ice of the White Sea in 1933.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1935–37	Discovery Investigations	G. E. R. Deacon L. C. Hill	R.R.S. *Discovery II* (4th commission)
	Circumpolar oceanographical cruise in summer months planned, but ship diverted to Bay of Whales in Ross Sea to search for Lincoln Ellsworth and H. Hollick-Kenyon (*see above*); revised programme included observations in Ross Sea, lines of observations across Indian and Atlantic sectors of Southern Ocean, and more concentrated work in waters of Falkland Islands Dependencies; visited Balleny Islands, South Georgia and South Orkney Islands; continued survey of South Shetland Islands		
1936–37	German whaling fleet operated in Southern Ocean for first time		
1936–37	Norwegian (Christensen) Antarctic expedition	— Bråvold (Manager)	*Thorshammer*
	Sighted western part of King Leopold and Queen Astrid Coast (a part of Princess Elizabeth Land) in February 1937		
1936–37	Norwegian (Christensen) Antarctic expedition	Lars Christensen ? ?	 *Thorshavn* *Firern*
	Antarctic coastline photographed from the air between West Ice Shelf in Kaiser Wilhelm II Land and Proclamation Island in Enderby Land; landed at Scullin Monolith, which had previously been fixed by Sir Douglas Mawson, the only astronomical position hitherto determined along this coast; Prins Harald Kyst discovered, photographed from the air, and claimed for Norway on 4 February 1937; reconnaissance flight over Prinsesse Ragnhild Kyst; sighted Prinsesse Astrid Kyst in long. 7° E.		
1936–37	Discovery Investigations	T. J. Hart C. R. U. Boothby	R.R.S. *William Scoresby* (6th commission)
	Whale-marking cruise in South Indian Ocean; sighted northern extremity of Enderby Land		
1937	British expedition	C. S. Thomsen	H.M.S. *Ajax*
	While returning from South Georgia with Governor of Falkland Islands in January, assisted in search for missing boat crew from *Discovery II* at King George Island, South Shetland Islands		
1937	Enormous expansion of pelagic whaling industry led to International Whaling Conference held in London in June: agreement reached on restrictions on minimum size limit for various species, date limits for Antarctic whaling season, and prohibition of whaling in certain areas; the first comprehensive international agreement for the conservation of whale stocks		
1937–38	Discovery Investigations	G. W. Raynor R. C. Freaker	R.R.S. *William Scoresby* (7th commission)
	Whale-marking cruise in Scotia Sea and Bellingshausen Sea, covering an expanse of ocean between Bouvetøya and Peter I Øy; landed on Saunders Island in South Sandwich Islands		

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1937–39	Discovery Investigations Oceanographical work; circumpolar voyage in summer months for comparison with winter circumpolar voyage in 1932, followed by a long series of repeated observations along the Greenwich meridian and long. 20° E.; visited Balleny Islands, roughly charting most of the group; landed on Bouvetøya	N. A. Mackintosh[1] H. F. P. Herdman[2] L. C. Hill	R.R.S. *Discovery II* (5th commission)
1938	French Government Decree of 1 April fixed boundaries of Terre Adélie (between longs. 136° and 142° E.)		
1938	International Whaling Conference held in London in June; signatory governments assumed obligation to enforce agreements, thus making it technically possible for the first time to control pelagic whaling in the Antarctic		
1938	British and French Governments agreed on 25 October to recognize reciprocal free rights of air navigation over Terre Adélie and British Commonwealth territories in the Antarctic		
1938–39	German Antarctic Expedition Three weeks spent in the Prinsesse Astrid Kyst and Kronprinsesse Märtha Kyst areas of Dronning Maud Land; over 12,000 km. flown by two aircraft which photographed about 350,000 sq.km. of territory between longs. 14° W. and 20° E.; area renamed "Neu-Schwabenland" and claimed for German Government between 19 January and 15 February 1939 at a number of points	Alfred Ritscher A. Kottas	*Schwabenland*
1938–39	United States expedition Visited Princess Elizabeth Land; flight made inland to lat. 72° S., long. 79° E.; named area seen from this point "American Highland" and claimed it for United States on 11 January 1939; landed at three points on the coast in this region	Lincoln Ellsworth L. Johansen	*Wyatt Earp* (4th voyage)
1939	Norwegian Royal Decree of 14 January proclaimed sovereignty over Antarctic sector between long. 20° W. and 45° E., subsequently named Dronning Maud Land		
1939	French expedition Oceanographical cruise; visited Prince Edward Islands, Iles Crozet and Iles de Kerguelen to make biological collections	Fabre de la Ripelle	*Bougainville*
1939	British naval operation This submarine, based on Colombo, cruised southwards to examine anchorages in Iles Crozet and Prince Edward Islands	H. V. King	H.M. Submarine *Olympus*

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[1] Chief scientist October 1937 to January 1938.
[2] Chief scientist January 1938 to May 1939.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1939–41	United States Antarctic Service Expedition	Richard E. Byrd (3rd expedition)[1]	
		Paul A. Siple (Leader of West Base)	
		Richard B. Black (Leader of East Base)	
		I. Lystad	U.S.M.S. *North Star*
		?	U.S.S. *Bear*
	Two parties wintered, one at "Little America III" (West Base), Bay of Whales, Ross Ice Shelf, and the other at Stonington Island (East Base), in Marguerite Bay, Graham Land; extensive explorations by air were made from these two bases, and three flights were made southwards over the pack ice of Amundsen Sea, locating the Walgreen Coast of Marie Byrd Land; in Graham Land important sledge journeys extended the discoveries of the British expedition of 1934–37 south-westwards down King George VI Sound to Ronne Entrance (proving insularity of Alexander Land), and south-eastwards to Black Coast; in Marie Byrd Land and on the Ross Ice Shelf the discoveries of Byrd's two previous expeditions were greatly extended, especially in the region of Edsel Ford Ranges; comprehensive scientific programme at both bases; the expedition, which aimed to start a permanent occupation to strengthen United States claims in Antarctica, was recalled in 1941 when Congress did not provide funds to continue the work		
1940	Argentine Presidential Decree of 30 April established Comisión Nacional del Antártico to handle all questions relating to Argentine Antarctic interests (revised on 4 April 1956)		
1940	British naval operation	R. C. O'Connor	H.M.S. *Neptune*
	Searched Prince Edward Islands and Iles de Kerguelen in October for signs of enemy activity		
1940	Chilean Presidential Decree of 6 November proclaimed sovereignty over Territorio Antártico Chileno (sector between longs. 53° and 90° W.)		
1940–41	German naval operation	Kapt. Rogge	*Atlantis* (Hilfskreuzer *16*)
	This commerce raider operated in South Atlantic and Indian Oceans; making use of anchorages at Iles de Kerguelen for rendezvous with German supply ship *Alstertor*		
1940–41	German naval operation	Robert Eyssen	*Komet* (Hilfskreuzer *45*)
	Following her passage along the Northern Sea Route in 1940, this commerce raider operated in the Pacific, including a voyage along the Antarctic coastline from Cape Adare to Shackleton Ice Shelf and reprovisioning at Iles de Kerguelen		
1940–41	German naval operation	Ernst-Felix Krüder	*Pinguin* (Hilfskreuzer *33*)
	This commerce raider operated chiefly in Indian Ocean. In January 1941 she captured a Norwegian whaling fleet (factory ships *Ole Wegger* and *Pelagos*, supply ship *Solglimt*, and eleven catchers) in about lat. 59° S., long. 2° 30′ W. One of the catchers (renamed *Adjutant*) retained as tender; remainder sent to France. Anchorages in Iles de Kerguelen used as rendezvous with German supply ship *Alstertor*. *Pinguin* was sunk by H.M.S. *Cornwall* in May 1941 after she had captured 136,550 tons of British and Allied shipping. Thereafter Southern Ocean pelagic whaling ceased until end of war		

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[1] Commander of expedition; did not winter.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1941	British naval operation	A. T. G. C. Peachey	H.M.S. *Queen of Bermuda*
	Destroyed oil fuel installations and coal stocks at Deception Island, South Shetland Islands, in March, to deny their use to enemy raiders		
1941	Australian naval operation	G. D. Moore	H.M.A.S. *Australia*
	Searched Iles de Kerguelen and Iles Crozet in November for signs of enemy activity		
1941	British Naval Meteorological Branch established a forecasting office at Stanley, Falkland Islands; responsibility taken over by Air Ministry, London, in 1947; became headquarters of Falkland Islands and Dependencies Meteorological Service in 1950 (*q.v.*)		
1942	Argentine expedition	Alberto J. Oddera	*Primero de Mayo* (1st voyage)
	Visited Deception Island, South Shetland Islands, in January to February and on 8 February took formal possession[1] for Argentine Government of sector between longs. 25° W. and 68° 34′ W., south of lat. 60° S.; carried out hydrographic survey at Melchior Islands, Palmer Archipelago		
1942	Chilean Government Decree of 27 March established Comisión Chilena Antártica to handle all questions relating to Chilean Antarctic interests		
1943	British naval operation	E. W. Kitson	H.M.S. *Carnarvon Castle*
	In January obliterated Argentine marks of sovereignty left on Deception Island by *Primero de Mayo* in 1942 and hoisted British flag, leaving record of ship's visit; hoisted British flag on Signy Island, South Orkney Islands, leaving similar record; called on Argentine meteorological station at Laurie Island, South Orkney Islands		
1943	Argentine expedition	Silvano Harriague	*Primero de Mayo* (2nd voyage)
	Completed charting of Melchior Islands in February. A cylinder was deposited on 1 or 2 March at Port Lockroy claiming for Argentine Government the sector between longs. 25° W. and 68° 34′ W., south of lat. 60° S. At Deception Island the British emblems were removed and the Argentine flag repainted. Visited Stonington Island in Marguerite Bay, where materials left by the United States Antarctic Service Expedition in 1941 were recovered		
1943–44	British naval expedition (Operation "Tabarin [I]")	J. W. S. Marr[2] (Port Lockroy) W. R. Flett[3] (Deception Island) K. A. J. Pitt V. A. J. B. Marchesi	 *Fitzroy* H.M.S. *William Scoresby*
	Permanent meteorological stations established at Port Lockroy (Base A) and Deception Island (Base B); Argentine emblems at these two places and at Melchior Islands removed; ships attempted, without success, to establish occupation party at Hope Bay; found no suitable site for base on Graham Land coast between Antarctic Sound and Andvord Bay; visited South Orkney Islands and South Georgia; *William Scoresby* hoisted British flag at Cape Renard, leaving record of ship's visit. In winter 1944, scientific programme initiated, including geology, biology and survey. [For continuation see annual entries below; under Falkland Islands Dependencies Survey from 1945 onwards]		

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[1] The Argentine Government officially informed the United Kingdom Government of this action on 15 February 1943.

[2] In command of all shore staff during 1944.

[3] Leader of 1944 wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1944	International Whaling Conference, held in London in February, proposed new principles and regulations to limit total annual catch at a level which would not impair existing stock of whales		
1944–45	British naval expedition (Operation "Tabarin [II]")	A. Taylor[1] (Hope Bay)	
		G. J. Lockley[2] (Port Lockroy)	
		A. Reece[2] (Deception Island)	
		K. A. J. Pitt	*Fitzroy*
		V. A. J. B. Marchesi	H.M.S. *William Scoresby*
		R. C. Sheppard	*Eagle*
	Two existing stations relieved; new meteorological station established at Hope Bay (Base D); hut built in Sandefjord Bay, Coronation Island. In winter 1945, Hope Bay survey and geological programme initiated with circumnavigation of James Ross Island		
1945	At end of war administrative responsibility for stations established by British Operation "Tabarin" transferred from Admiralty to Colonial Office under new name "Falkland Islands Dependencies Survey". Responsibility transferred to Governor of Falkland Islands in October 1948. Falkland Islands Dependencies Scientific Bureau in London organized in 1949 to co-ordinate work on data and specimens collected		
1945–46	Pelagic whaling resumed by a few companies in Southern Ocean		
1945–46	Falkland Islands Dependencies Survey	E. W. Bingham[3] (Stonington Island)	
		V. I. Russell[4] (Hope Bay)	
		G. J. Lockley[4] (Port Lockroy)	
		H. P. Featherstone[4] (Deception Island)	
		M. A. Choyce[4] (Cape Geddes)	
		K. A. J. Pitt	*Fitzroy*
		V. A. J. B. Marchesi	*William Scoresby*
		R. C. Sheppard	*Trepassey*
	Three existing stations relieved; new stations established at Cape Geddes, Laurie Island (Base C), and Stonington Island (Base E). In winter 1946, route inland from Stonington Island surveyed; survey of Trinity Peninsula and James Ross Island areas continued from Hope Bay		
1946	C. A. Gibson-Hill (British) visited South Georgia to make ornithological observations in January to March		
1946	Argentine Government Decree of 2 September extended western limit of their claim from long. 68° 34′ W. (see 1942) to long. 74° W.		
1946	International Convention for the Regulation of Whaling, signed at Washington in December, established International Whaling Commission which subsequently met annually to agree on necessary measures to conserve stock of whales		

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[1] In command of all shore staff during 1945.
[2] Leader of 1945 wintering party.
[3] In command of all F.I.D.S. staff during 1946.
[4] Leader of 1946 wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1946–47	First full-scale post-war effort to resume pelagic whaling in Southern Ocean. Dutch and Soviet whaling fleets operated in Southern Ocean for first time		
1946–47	British whaling expedition	Rupert Trouton (Director) Reider Pedersen	 *Balaena*

This United Whalers Ltd. floating factory operated mainly off Queen Mary Land and Wilkes Land from January to March 1947. Pioneer use of amphibious aircraft by unit under J. Grierson for ice reconnaissance and whale spotting; land sighted from ship between longs. 109° and 111° E., and peaks reported in about lat. 66° S., long. 110° E. during flight of 12 February. Scientific programme included meteorology, ornithology, and whale physiology and biochemistry with a view to fuller utilization of whale meat for human consumption in United Kingdom

1946–47	Falkland Islands Dependencies Survey	K. S .P. Butler[1] (Stonington Island)	
		F. K. Elliott[2] (Hope Bay)	
		J. R. S. Huckle[2] (Deception Island)	
		O. Burd[2] (Argentine Islands)	
		G. de Q. Robin[2] (Signy Island)	
		Capt. White	*Fitzroy*
		Eugene Burden	*Trepassey*

Five existing stations relieved; Deception Island station (destroyed by fire, September 1946) rebuilt; site of British Graham Land Expedition hut on Winter Island in Argentine Islands re-occupied (Base F); site for new station in Admiralty Bay, King George Island, reconnoitred, and small hut built and temporarily occupied; new meteorological station established on Signy Island, South Orkney Islands (Base H), and all personnel transferred there from Cape Geddes; Port Lockroy evacuated for winter. In winter 1947, two sledge parties surveyed east coast of Graham Land between lats. 63° 30′ S. and 75° S., one travelling from Hope Bay to Three Slice Nunatak and Stonington Island, the second (organized jointly with Ronne Antarctic Research Expedition, 1947–48) from Stonington Island via Three Slice Nunatak to Bowman Peninsula and back

1946–47	United States naval expedition (Operation "Highjump")	Richard E. Byrd (4th expedition)[3]	
		George F. Kasco[4]	
		Clifford M. Campbell[5]	
		Richard H. Cruzen[6]	U.S.S. *Mount Olympus*
		?	U.S.S. *Burton Island*
		?	U.S.S. *Merrick*
		Charles W. Thomas	U.S.C.G. *Northwind* [7]
		Delbert S. Cornwell	U.S.S. *Philippine Sea*
		?	U.S.S. *Yancey*
		?	U.S. Submarine *Sennet*

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[1] In command of all F.I.D.S. staff during 1947.
[2] Leader of 1947 wintering party.
[3] Director of whole operation.
[4] Chief scientist.
[5] Commander of shore operations at "Little America IV".
[6] In executive command of Task Force 68.
[7] Central group, commanded by R. H. Cruzen.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1946–47	United States naval expedition (*cont.*)	George J. Dufek	U.S.S. *Pine Island*
		?	U.S.S. *Brownson* [1]
		?	U.S.S. *Canisteo*
		Charles A. Bond	U.S.S. *Currituck*
		?	U.S.S. *Cacapon* [2]
		Claude E. Bailey	U.S.S. *Henderson*

The largest exploratory venture hitherto attempted in Antarctica. Objective to test methods and equipment and consolidate and extend basis for United States claims to largest practical area of Antarctic continent by large-scale photographic reconnaissance, and to give polar experience to 4000 men. U.S. Navy Task Force 68, of thirteen ships, was divided into three groups: Central group established shore station at "Little America IV", Bay of Whales, January to February 1947, from which twenty-nine photographic flights were made over Ross Ice Shelf, its coasts and the Polar Plateau, and overland journeys were made to Rockefeller Mountains; limited programme of meteorology, glaciology and geophysics; Admiral Byrd made his second flight to South Pole on 15 February 1947. Eastern group made flights over coastal areas in Pacific sector, photographing much of ice shelf coast between longs. 100° W. and 125° W., parts of Charcot Island, Alexander Land and, later, Kronprinsesse Märtha Kyst. Western group cruised westwards from Oates Land to Prinsesse Astrid Kyst, making twenty-five photographic reconnaissance flights over continental coast. No wintering parties remained in Antarctica.

1946–47 Niall Rankin (British) visited South Georgia to photograph wild life

1947	Argentine expedition	Luis Miguel García[3]	
		— Nadau[4] (Gamma Island)	
		? (Laurie Island)	
		L. M. Maloberti	*Patagonia*
		— Brashariot	*Chaco*
		— Vinquales	*Ministro Ezcurra*
		J. R. Pisani Reilly	*Don Samuel*
		?	*King*
		?	*Murature*
		— Diaz	*Fournier*

Permanent meteorological station established in January on Gamma Island, Melchior Islands (known as "Melchior"); Laurie Island station ("Orcadas") in South Orkney Islands relieved; Deception Island and Admiralty Bay in South Shetland Islands, Port Lockroy, Argentine Islands and Stonington Island in west Graham Land visited. On this and on all subsequent Argentine expeditions, aircraft used locally for ice reconnaissance and air photography. [For continuation see annual entries below]

1947	Chilean expedition	Federico Guesalaga Toro[3]	
		Boris Kopaitic O'Neil[4] (Greenwich Island)	
		Ernesto González Navarrete	*Iquique*
		Gabriel Rojas Parker	*Angamos*

Permanent meteorological station established in February at Discovery Bay, Greenwich Island, South Shetland Islands (known as "Arturo Prat"); west coast of Graham Land reconnoitred as far south as Stonington Island in Marguerite Bay; army, air force and scientific summer parties examined area with view to planning future work; in this and succeeding seasons, seaplanes were used for air reconnaissance. [For continuation see annual entries below]

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[1] Eastern group, commanded by G. J. Dufek.

[2] Western group, commanded by C. A. Bond.

[3] In command of summer operations.

[4] Leader of 1947 wintering party.

Date	Nationality, etc.	Leader or Commander	Ship
1947	Royal Australian Air Force made three reconnaissance flights southwards to Macquarie Island in March, investigating possibility of air liaison with planned occupation party; Macquarie Island photographed from air		
1947	Australian Government authorized, in August, establishment of scientific and meteorological stations for five years on Heard Island and Macquarie Island; also inauguration of systematic exploration of Australian Antarctic Territory. This initiated the Australian National Antarctic Research Expeditions (ANARE), for which see annual entries below		
1947	Argentine Douglas naval aircraft, piloted by Gregorio Portillo, made non-stop flight from Piedrabuena to Deception Island and Melchior Islands to drop mail on 13 December; crossed Antarctic Circle and flew over Adelaide Island before returning to base		
1947	United Kingdom Government invited Argentine and Chilean Governments in December to submit the dispute about Antarctic sovereignty to the International Court of Justice, a proposal which both governments rejected		
1947–48	Australian National Antarctic Research Expedition	S. A. C. Campbell[1]	
		G. Dixon[2]	L.S.T. *3501*
		A. V. Gotley[3] (Heard Island)	
		A. R. Martin[3] (Macquarie Island)	
	First cruise, in November 1947 to January 1948, established research station at Atlas Cove, Heard Island, in December 1947, and left a reserve fuel store at Iles de Kerguelen. Second cruise, in February to April 1948, established research station at Buckles Bay, Macquarie Island, in March. During winter 1948 topographical surveys were made and comprehensive long-term scientific programmes were initiated at both stations		
1947–48	Argentine expedition	Ricardo Hermelo[4]	
		Luis Miguel García[5]	
		Leonardo Roque de Costillas[3] (Gamma Island)	
		? (Laurie Island)	
		Roberto A. Cabrera[3] (Deception Island)	
		— Morroni	*Bouchard*
		?	*Granville*
		?	*King*
		Luis E. Raynaud	*Ministro Ezcurra*
		Oscar H. Rousseau	*Pampa*
		Raul Kolbe	*Charua*
		?	*Murature*
		?	*Esiv Brunt*
		Alberto Patron	*Seaver*
		Guillermo José Zarrabéitia	*Parker*
		Pedro B. Cabello Moya	*Chiriguano*

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[1] Leader for first summer cruise.
[2] Leader for second summer cruise.
[3] Leader of 1948 wintering party.
[4] In command of summer operations until March 1948.
[5] In command of summer operations from March 1948.

<table>
<tr><th>Date</th><th>Nationality, etc.</th><th>Leader or Commander</th><th>Ship</th></tr>
<tr><td>1947–48</td><td>Argentine expedition (*cont.*)</td><td>Luis Ambrosini</td><td>*Sanavirón*</td></tr>
<tr><td></td><td></td><td>Domingo G. Luis</td><td>*Fournier*</td></tr>
<tr><td></td><td></td><td>?</td><td>*Robinson*</td></tr>
<tr><td></td><td colspan="3">Two existing stations relieved; new meteorological station ("Primero de Mayo") established on Deception Island; refuge huts built in Potter Cove ("Teniente Jubany") and Admiralty Bay, King George Island; hydrographic surveys made</td></tr>
<tr><td>1947–48</td><td>Norwegian expedition</td><td>Holger Holgersen</td><td></td></tr>
<tr><td></td><td></td><td>Nils Larsen</td><td>*Brategg*</td></tr>
<tr><td></td><td colspan="3">Research voyage organized by Norsk Hvalfangstselskapers Forbund [Federation of Norwegian Whaling Companies]; oceanographical investigations in Pacific sector of Southern Ocean westwards from Peter I Øy to long. 174° 31′ W., between lat. 62° S. and ice edge; landings made on Peter I Øy and Deception Island for geological and zoological work</td></tr>
<tr><td>1947–48</td><td>United States naval expedition (Operation "Windmill")[1]</td><td>Gerald L. Ketchum[2]</td><td></td></tr>
<tr><td></td><td></td><td>Edwin McDonald</td><td>U.S.S. *Burton Island*</td></tr>
<tr><td></td><td></td><td>Edward C. Folger, Jr.</td><td>U.S.S. *Edisto*</td></tr>
<tr><td></td><td colspan="3">Objective to secure ground control for air photographs taken during Operation "Highjump", 1946–47, with aid of helicopters. U.S. Navy Task Force 39 visited Davis Sea. *Edisto* worked westwards towards Gaussberg, while *Burton Island* worked eastwards to Shackleton Ice Shelf. Both ships then sailed eastwards to examine coastal area in long. 105° E. and islands off Knox Coast. Visited McMurdo Sound and Bay of Whales. Failed to make landfalls in Pacific Sector; visited Peter I Øy. Assisted relief of Ronne Antarctic Research Expedition and F.I.D.S. station on Stonington Island</td></tr>
<tr><td>1947–48</td><td>Chilean expedition</td><td>Ernesto González Navarrete[3]</td><td></td></tr>
<tr><td></td><td></td><td>Francisco Araya Prorromont[4] (Greenwich Island)</td><td></td></tr>
<tr><td></td><td></td><td>Hugo Schmidt Prado[4] (Cape Legoupil)</td><td></td></tr>
<tr><td></td><td></td><td>?</td><td>*Covadonga*</td></tr>
<tr><td></td><td></td><td>?</td><td>*Rancagua*</td></tr>
<tr><td></td><td colspan="3">Existing station relieved; new meteorological station ("General Bernardo O'Higgins") established near Cape Legoupil, Trinity Peninsula; army and scientific summer parties continued 1947 reconnaissance</td></tr>
<tr><td>1947–48</td><td>Falkland Islands Dependencies Survey</td><td>V. E. Fuchs[5] (Stonington Island)</td><td></td></tr>
<tr><td></td><td></td><td>F. K. Elliott[4] (Hope Bay)</td><td></td></tr>
<tr><td></td><td></td><td>G. P. J. Barry[4] (Port Lockroy)</td><td></td></tr>
<tr><td></td><td></td><td>A. G. Scadding[4] (Deception Island)</td><td></td></tr>
<tr><td></td><td></td><td>T. M. Nicholl[4] (Argentine Islands)</td><td></td></tr>
<tr><td></td><td></td><td>R. M. Laws[4] (Signy Island)</td><td></td></tr>
<tr><td></td><td></td><td>E. Platt[4] (Admiralty Bay)</td><td></td></tr>
<tr><td></td><td></td><td>A. F. McFie</td><td>*John Biscoe*</td></tr>
<tr><td></td><td></td><td>Capt. White</td><td>*Fitzroy*</td></tr>
<tr><td></td><td colspan="3">Five existing stations relieved; Admiralty Bay (Base G) established as permanent meteorological station; Port Lockroy re-occupied. In winter 1948 experimental ionospheric station operated at Port Lockroy; biological programme initiated at Signy Island; geology and survey in Marguerite Bay and northern King George VI Sound carried out from Stonington Island; Hope Bay station destroyed by fire in November</td></tr>
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[1] Also known as U.S. Navy Second Antarctic Development Project.

[2] Task Force Commander.

[3] In command of summer operations.

[4] Leader of 1948 wintering party.

[5] In command of all F.I.D.S. staff during 1948.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1947–48	Ronne Antarctic Research Expedition (United States)	Finn Ronne Isaac Schlossbach	*Port of Beaumont*
	In March 1947 to February 1948 expedition re-occupied "East Base" of U.S. Antarctic Service Expedition close to F.I.D.S. station on Stonington Island, west Graham Land; party included two women, the first to winter on Antarctic continent. From July 1947 subsidiary plateau meteorological station at head of Northeast Glacier occupied; in September to December geological sledge party visited northern Alexander Land; in October 1947 to January 1948 sledge party, organized jointly with F.I.D.S. and supported by American aircraft, travelled to Bowman Peninsula and back via Three Slice Nunatak; in November to December 1947 nine major flights were made southwards over Alexander Land, Charcot Island, King George VI Sound, east Graham Land south to about lat. 78° S. and Filchner Ice Shelf, and northwards to Beascochea Bay and Cabinet Inlet; many air photographs obtained. In February 1948 U.S.S. *Burton Island* and U.S.S. *Edisto* of Operation "Windmill" assisted departure of *Port of Beaumont* which had wintered in Back Bay		
1947–48	South African naval expedition (Operation "Snoektown")	John Fairbairn	H.M.S.A.S. *Transvaal*
	Formally raised national flag of Union of South Africa on Marion Island on 29 December 1947 and at Prince Edward Island on 4 January 1948; established permanent meteorological station on Marion Island under initial leadership of A. B. Crawford[1]		
1948	British naval expedition	J. G. Forbes B. L. Moore	H.M.S. *Snipe* H.M.S. *Nigeria*
	Snipe (sloop), with Governor of Falkland Islands on board, visited South Georgia and F.I.D.S. stations in South Orkney and South Shetland Islands and Graham Land in January; *Snipe* and *Nigeria* (cruiser) later visited British and foreign stations in South Shetland Islands and Palmer Archipelago; Governor joined *Nigeria* for this cruise		
1948	South African Proclamation of 24 January declared that by agreement with United Kingdom Government, British sovereignty over Prince Edward Islands would henceforth be exercised by H.M. Government in the Union of South Africa		
1948	Argentine naval manœuvres carried out during February in South Shetland Islands' waters under command of Contra-Almirante Harald Cappus; cruisers *Veinticinco de Mayo* and *Almirante Brown*, destroyers *Entre Rios*, *San Luis*, *Misiones*, *Santa Cruz*, *Mendoza* and *Cervantes*, accompanied by transports *Patagonia* and *Ushuaia* and about five small auxilliary vessels took part; some ships visited Deception Island and Melchior Islands briefly; seaplanes photographed Deception Island from air		
1948	Chilean Presidential visit	?	*Presidente Pinto*
	Presidente Gabriel González Videla, with large official party, visited Discovery Bay station and officially inaugurated Cape Legoupil station in February		
1948	Australian National Antarctic Research Expedition	S. A. C. Campbell K. E. Oom	H.M.A.S. *Wyatt Earp*
	Sailed from Melbourne in February to explore coast of King George V Land and search for a site for a permanent station; twice attempted unsuccessfully to reach King George V Land; made running survey of Balleny Islands, landing on Borradaile Island; called at Macquarie Island		

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[1] Subsequent annual relief expeditions are not listed here.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1948	A Catalina of the Royal Australian Air Force flew to Macquarie Island on 4 August with a replacement diesel engineer whose predecessor had been accidentally drowned		
1948–49	Falkland Islands Dependencies Survey	V. E. Fuchs[1] (Stonington Island)	
		G. Stock[2] (Deception Island)	
		T. M. Nicholl[2] (Argentine Islands)	
		R. M. Laws[2] (Signy Island)	
		G. Hattersley-Smith[2] (Admiralty Bay)	
		H. Kirkwood	*John Biscoe*
	Hope Bay and Port Lockroy stations evacuated; relief of Stonington Island station prevented by ice conditions; four other existing stations relieved; South Georgia visited. Admiralty hydrographic unit charted Port Foster, Deception Island, and approaches. In winter 1949 ground surveys of Marguerite Bay and northern King George VI Sound continued from Stonington Island, and geological party reached Eklund Islands in southern King George VI Sound. Biological work continued		
1948–49	Argentine expedition	? (Gamma Island)	
		? (Laurie Island)	
		? (Deception Island)	
		?	*Pampa*
		?	*Chaco*
		?	*Punta Ninfas*
		Gabino Santoro	*Sanavirón*
		Enrique G. M. Grünwaldt	*Chiriguano*
	Three existing stations relieved; refuge huts built in Telefon Bay ("Thorne") and Pendulum Cove ("Pendulo"), Deception Island, and in Neko Harbour, Danco Coast; hydrographic surveys made in Gerlache Strait		
1948–49	British naval expedition	John Waterhouse	H.M.S. *Sparrow*
		C. L. Firth	H.M.S. *Glasgow*
	Sparrow (sloop) visited British and foreign stations in South Orkney and South Shetland Islands and Palmer Archipelago; *Glasgow* (cruiser) visited South Georgia		
1948–53	French expedition	André F. Liotard[3]	
		Michel Barré[4]	
		M. Marret[5]	
		Max Douguet[6]	*Commandant Charcot*
		J. Engebretsen[7] H. C. Andersen[8]	*Tottan*
	In 1948–49 *Commandant Charcot* tried unsuccessfully to reach Terre Adélie to establish a station; visited Balleny Islands and Macquarie Island. In January 1950, research station established at Port-Martin, Terre Adélie; depots laid at Cap Jules and Cape Denison; *Commandant Charcot* also visited Heard		

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[1] In command of all F.I.D.S. staff during 1949.

[2] Leader of 1949 wintering party.

[3] Leader of 1948–49 summer party and of 1950 wintering party.

[4] Leader of 1951 wintering party.

[5] Leader of 1952 wintering party.

[6] In executive command of *Commandant Charcot* during summer seasons 1948–49, 1949–50 and 1950–51.

[7] In executive command of *Tottan* during 1951–52 summer season.

[8] In executive command of *Tottan* during 1952–53 summer season.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1948–53	French expedition (*cont.*)		
	Island and Iles de Kerguelen. During winter 1950 scientific programme initiated at Port-Martin; survey journeys made to eastern and western boundaries of Terre Adélie and to Cape Denison. In January 1951 Port-Martin relieved; *Commandant Charcot* made hydrographic observations in vicinity, a coastal reconnaissance westwards to long. 138° 20′ E., and visited Macquarie Island. During winter 1951 scientific work at Port-Martin was extended, particularly geophysics and biology, and sledging programme continued. On 14 January 1952 Port-Martin relieved by *Tottan*; on 23 January station destroyed by fire; reduced party wintered on Ile des Pétrels, Archipel de Pointe Géologie. During winter 1952 scientific programme limited to biology, meteorology and glaciology; journeys made to Port-Martin and to western boundary of Terre Adélie. Early in January 1953 party on Ile des Pétrels evacuated by *Tottan*; ship visited Port-Martin and Cap Pépin		
1949	Argentine, Chilean and United Kingdom Governments exchanged declarations in January with a view to restricting use of warships south of lat. 60° S. These tripartite declarations have since been renewed annually		
1949	Australian Government reorganized the administration of ANARE (see 1947) in January, and set up an Antarctic Division of the Australian Department of External Affairs to direct field operations and advise on all Australian Antarctic interests		
1949	Chilean expedition	Leopoldo Fontaine[1]	
		Augusto Varas Orrego[2] (Greenwich Island)	
		Arístides Migueles[2] (Cape Legoupil)	
		Jorge Gándara Bofil	*Covadonga*
		Carlos Bonafós	*Maipo*
		José Duarte	*Lautaro*
	Two existing stations relieved in January to February, that at Cape Legoupil with the help of aircraft; plan to establish new station in west Graham Land frustrated by adverse ice conditions in March		
1949	Australian National Antarctic Research Expedition	P. G. Law[3]	
		T. G. Heath[4]	
		R. W. Allison[2] (Heard Island)	
		A. M. Gwynn[2] (Macquarie Island)	
		G. Dixon	H.M.A.S. *Labuan* (formerly L.S.T. *3501*)
	First cruise, in January to February, relieved station at Heard Island, also visiting Iles de Kerguelen. Second cruise, in March to April, relieved station at Macquarie Island. During winter 1949 topographical surveys of Heard Island completed and scientific programme at both islands extended		
1949	British National Institute of Oceanography founded in April; took over responsibility for Discovery Investigations from Falkland Islands Dependencies Administration in March		

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[1] In command of summer operations.

[2] Leader of 1949 wintering party.

[3] Leader for first summer cruise.

[4] Leader for second summer cruise.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1949–50	Argentine expedition	? (Gamma Island)	
		J. Smiter Estrada[1] (Laurie Island)	
		? (Deception Island)	
		Ezequiel N. Vega	*Chaco*
		Enrique Arizzi	*Punta Ninfas*
		Benigno Ignacio Varela	*Chiriguano*
		?	*Yamana*
	Three existing stations relieved; hut built in Paradise Harbour, Danco Coast, but not occupied until 1951; hydrographic surveys made in Gerlache Strait; some geological and biological work undertaken in this and succeeding seasons by summer parties		
1949–50	British naval expedition	G. R. P. Goodden	H.M.S. *Bigbury Bay*
		W. R. Parker	R.F.A. *Gold Ranger*
	Bigbury Bay (frigate) and *Gold Ranger* (Royal Fleet auxiliary) visited Deception Island; Governor of Falkland Islands accompanied *Bigbury Bay*		
1949–50	Chilean expedition	Alfredo Natho Dávison[2]	
		Fernando Dorión W.[1] (Greenwich Island)	
		Roberto Labra Nuñoz[1] (Cape Legoupil)	
		— Balaresque	*Iquique*
		Mario Espinoza Gacitúa	*Maipo*
		Víctor Wilson	*Lientur*
	Two existing stations relieved; refuge hut built in Coppermine Cove, Robert Island		
1949–50	Falkland Islands Dependencies Survey	J. H. Chaplin[1] (Port Lockroy)	
		J. R. Green[1] (Deception Island)	
		H. G. Heywood[1] (Argentine Islands)	
		W. J. L. Sladen[1] (Signy Island)	
		J. A. Kendall[1] (Admiralty Bay)	
		D. Borland[1] (Grytviken)	
		H. Kirkwood	*John Biscoe*
	New station established at Grytviken, South Georgia (Base M), took over meteorological observations from Cia. Argentina de Pesca on 1 January 1950. With help of Norseman and Auster aircraft, Stonington Island station evacuated; Port Lockroy station re-occupied; four other existing stations relieved; Governor of Falkland Islands visited F.I.D.S. stations. In winter 1950 F.I.D.S. scientific programme restricted to routine meteorological observations and biology		
1949–50	French expedition	Pierre Sicaud[2]	
		?	*La Pérouse*
		Max Douguet	*Commandant Charcot*
	In December 1949 landing made from *La Pérouse* in Baie du Marin on Ile de la Possession, Iles Crozet, and plaque fixed affirming French rights to the archipelago; in same month temporary shore station established by *La Pérouse* at Port-aux Français in Baie du Morbihan, Iles de Kerguelen; evacuated in April by *Commandant Charcot*		

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[1] Leader of 1950 wintering party.

[2] In command of summer operations.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1949–52	Norwegian–British–Swedish Antarctic Expedition	John Giæver Guttorm Jakobsen	*Norsel*[1]
	First international expedition to Antarctica. In February 1950 expedition's base "Maudheim" established in lat. 71° 03′ S., long. 10° 55′ W. on ice shelf of Dronning Maud Land, following air reconnaissance by R.A.F. Antarctic Flight, commanded by G. B. Walford. In March to April 1950 meteorological and glaciological programmes at "Maudheim" initiated; by October 300 km. inland route established and advance base placed in lat. 72° 17′ S. long. 3° 48′ W.; from there survey, geological and glaciological observations, including successful seismic soundings, made by field parties. In January 1951 planned programme of air photography by Norwegian air unit, commanded by K. Friis-Baastad, curtailed by bad weather and damage to aircraft. In December 1951 to January 1952 Swedish Air Force unit, commanded by R. D. G. J. von Essen, continued air photography programme; *Norsel* made running surveys and hydrographic observations along coast of Dronning Maud Land		
1950	Falkland Islands and Dependencies Meteorological Service established with headquarters at Stanley, Falkland Islands. The Argentine meteorological station at Grytviken, South Georgia, was taken over by this organization in January. First regular forecasts issued to local whaling stations; extended in December to cover pelagic whaling area between longs. 0° and 60° W., between lats. 50° and 65° S.		
1950	Australian National Antarctic Research Expedition	T. G. Heath[2] J. W. P. McCarthy[3] (Heard Island) D. S. Cohen[3] (Macquarie Island) D. Shaw	H.M.A.S. *Labuan*
	First cruise, January to March, relieved station at Heard Island, also visiting Iles de Kerguelen. Second cruise, in April, relieved the station at Macquarie Island. Meteorological and biological work continued at both stations; geophysical programme at Macquarie Island considerably enlarged		
1950	Soviet Government sent memorandum to other interested governments on 7 June intimating that they could not recognize any decisions on the regime for the Antarctic taken without their participation		
1950	Australian naval relief expedition	G. C. Oldham	H.M.A.S. *Australia*
	Visited Heard Island in July to bring out medical officer who had been taken ill		
1950	Exchange of Notes in December confirmed transfer of sovereignty over Heard Island from United Kingdom to Australia; effective from December 1947		
1950–51	Chilean expedition	Diego Munita W.[4] Gastón Kulczweski S.[5] (Greenwich Island) Carlos Reyes G.[5] (Cape Legoupil)	

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[1] In 1949–50 five members of expedition travelled to vicinity of South Sandwich Islands on Norwegian whaling factory *Thorshøvdi*, and there transferred to *Norsel*. *Norsel* returned to Norway at end of each summer season.

[2] Leader for both summer cruises.

[3] Leader of 1950 wintering party.

[4] In command of summer operations.

[5] Leader of 1951 wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1950–51	Chilean expedition (*cont.*)	Roberto Araos Tapia[1] (Paradise Harbour)	
		?	*Angamos*
		?	*Lientur*
		?	*Lautaro*

Two existing stations relieved; permanent meteorological station ("Gabriel González Videla") established on Waterboat Point in Paradise Harbour, Danco Coast; hydrographic surveys of approaches to each station completed

1950–51	Argentine expedition	Rodolfo N. Panzarini[2]	
		Hernán Pujato[3]	
		? (Gamma Island)	
		? (Laurie Island)	
		? (Deception Island)	
		? (Paradise Harbour)	
		Julio Mottel[1] (Barry Island)	
		Sanchez Moreno	*Bahía Buen Suceso*
		?	*Punta Loyola*
		Laerte Santucci	*Sanavirón*
		Ricardo O. Saiz	*Chiriguano*
		?	*Santa Micaela*

Three existing stations relieved; hut in Paradise Harbour extended and established as a permanent meteorological station ("Almirante Brown"); another permanent station ("General San Martín") established on Barry Island, Debenham Islands; hydrographic surveys made in Gerlache Strait and partial topographical and air survey of Deception Island carried out

1950–51	Discovery Investigations	H. F. P. Herdman	
		J. F. Blackburn	R.R.S. *Discovery II* (6th commission)

Oceanographical work organized by British National Institute of Oceanography to fill gaps in earlier Discovery Investigations: lines of stations worked in the Indian Ocean sector of Southern Ocean in winter and summer, in the Pacific sector in winter and spring, in the Atlantic sector in winter, and in the central Indian Ocean in winter and spring. The ship's route included the second winter circumpolar cruise so far achieved, and visits to Macquarie Island, South Sandwich Islands, Iles de Kerguelen and Heard Island

1950–51	Falkland Islands Dependencies Survey	R. A. Lenton[1] (Deception Island)	
		J. R. Green[1] (Argentine Islands)	
		J. J. Cheal[1] (Signy Island)	
		K. R. Gooden[1] (Admiralty Bay)	
		R. M. Laws[1] (Grytviken)	
		W. Johnston	*John Biscoe*

Port Lockroy station evacuated for winter; five other stations relieved; reports of foreign stations established on Danco Coast of Graham Land investigated; South Georgia whaling stations visited. Admiralty hydrographic unit began taut-wire survey of Bransfield Strait. Routine ionospheric observations made at Deception Island from August 1951 onwards. Elephant Seals studied in South Georgia

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[1] Leader of 1951 wintering party.

[2] In overall command of summer operations.

[3] In command of summer operation to establish Barry Island station.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1950–	French expedition	Pierre Sicaud[1]	
		?	*Italio Marsano*
	Permanent meteorological station established in January 1951 at Port-aux-Français, Iles de Kerguelen, and fully operational by end of 1951; site examined for suitability as air base. Subsequent annual relief expeditions are not listed here. Scientific work extended in 1952 to include geophysical and biological work; again extended in 1957 for purposes of International Geophysical Year (I.G.Y.)		
1951	South African Weather Bureau began issuing daily southern hemisphere weather charts in January		
1951	Australian National Antarctic Research Expedition	P. G. Law[2] F. T. Hannan[3] (Heard Island) R. K. Stubbs[3] (Macquarie Island)	
		I. Cartwright	H.M.A.S. *Labuan*
		M. Mathers	*River Fitzroy*
	Labuan, in January to March, relieved station at Heard Island, also visiting Iles de Kerguelen; extensive damage during outward voyage caused her to be withdrawn from service and replaced by *River Fitzroy*, which, in April to May, relieved station at Macquarie Island. Routine observations continued during winter 1951, and the first journey round Heard Island on foot was made		
1951	Argentine Government established Instituto Antártico Argentino in April to control and co-ordinate all Argentine Antarctic activities		
1951	Falkland Islands and Dependencies Meteorological Service started broadcasting forecasts for the area between longs. 40° and 70° W., between lats. 50° and 65° S., during each pelagic whaling season		
1951	Argentine Avro-Lincoln aircraft made non-stop flight from Rio Gallegos to Debenham Islands and back, dropping mail and supplies, on 19 December		
1951–52	Argentine expedition	Emilio L. Díaz[4] Daniel Canova[5] (Gamma Island) ? (Laurie Island) ? (Deception Island) ? (Paradise Harbour) Juan Carlos Bassini[5] (Barry Island) Luis Manuel Casanova[5] (Hope Bay)	
		Luis M. Iriate	*Bahía Buen Suceso*
		?	*Bahía Aguirre*
		M. Sanguinetti	*Punta Ninfas*
		O. E. Eguia	*Chiriguano*
		Aldo Molinari	*Sanavirón*
	Five existing stations relieved; new meteorological station ("Esperanza") established at Hope Bay in Trinity Peninsula; refuge hut ("Petrel") built on Dundee Island; hut built on Half Moon Island, South Shetland Islands, but not occupied until 1953; Paradise Harbour station repaired (damaged by fire, July 1951); hydrographic surveys made in Gerlache Strait; Maritime Governor of Tierra del Fuego visited Argentine stations in South Shetland Islands and northern Graham Land. In winter 1952 sledge journeys made for first time from Barry Island to southern Marguerite Bay and Trail Inlet		

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[1] In charge of 1950–51 summer party and director of operations until at least 1953.

[2] Leader for both summer cruises.

[3] Leader of 1951 wintering party.

[4] In command of summer operations.

[5] Leader of 1952 wintering party.

<table>
<tr><th>Date</th><th>Nationality, etc.</th><th>Leader or Commander</th><th>Ship</th></tr>
<tr><td>1951–52</td><td>Falkland Islands Dependencies Survey</td><td>G. W. Marsh[1] (Hope Bay)</td><td></td></tr>
<tr><td></td><td></td><td>R. A. Lenton[1] (Port Lockroy)</td><td></td></tr>
<tr><td></td><td></td><td>E. D. Stroud[1] (Deception Island)</td><td></td></tr>
<tr><td></td><td></td><td>N. S. W. Petts[1] (Argentine Islands)</td><td></td></tr>
<tr><td></td><td></td><td>A. W. Mansfield (Signy Island)</td><td></td></tr>
<tr><td></td><td></td><td>W. J. Meehan[1] (Admiralty Bay)</td><td></td></tr>
<tr><td></td><td></td><td>—[2] (Grytviken)</td><td></td></tr>
<tr><td></td><td></td><td>W. Johnston</td><td><i>John Biscoe</i></td></tr>
<tr><td></td><td colspan="3">Port Lockroy station re-occupied; Hope Bay station re-established in February after delay caused by armed resistance of Argentine party ashore; five other stations relieved; South Georgia whaling stations visited. Admiralty hydrographic unit charted channels between Port Lockroy and Booth Island. In December 1951 ionospheric work transferred to Port Lockroy. In winter 1952 Weddell Seals studied at Signy Island; Hope Bay survey programme included journeys to James Ross Island and Seal Nunataks</td></tr>
<tr><td>1951–52</td><td>South Georgia Survey (1st season)</td><td>V. D. Carse</td><td>—</td></tr>
<tr><td></td><td colspan="3">Summer topographical and geological survey of island initiated</td></tr>
<tr><td>1952</td><td>Chilean expedition</td><td>Fernando Tisné B.[3]</td><td></td></tr>
<tr><td></td><td></td><td>Julio Navarrete T.[1] (Greenwich Island)</td><td></td></tr>
<tr><td></td><td></td><td>Aquiles López B.[1] (Cape Legoupil)</td><td></td></tr>
<tr><td></td><td></td><td>Gerardo López[1] (Paradise Harbour)</td><td></td></tr>
<tr><td></td><td></td><td>— Carvajal M.</td><td><i>Angamos</i></td></tr>
<tr><td></td><td></td><td>?</td><td><i>Lientur</i></td></tr>
<tr><td></td><td></td><td>?</td><td><i>Leucotón</i></td></tr>
<tr><td></td><td colspan="3">Three existing stations relieved in January to March; limited hydrographic surveys made in Bransfield Strait area in this and succeeding seasons</td></tr>
<tr><td>1952</td><td>British naval expedition</td><td>J. A. Ievers</td><td>H.M.S. <i>Burghead Bay</i></td></tr>
<tr><td></td><td></td><td>?</td><td>H.M.S. <i>Veryan Bay</i></td></tr>
<tr><td></td><td colspan="3"><i>Burghead Bay</i> (frigate), with Governor of Falkland Islands on board, investigated armed resistance by Argentines at Hope Bay in February (<i>see above</i>); visited all F.I.D.S. stations except Port Lockroy. Admiralty hydrographic unit continued taut-wire survey of Bransfield Strait and charted Admiralty Bay and seaward coasts of Deception Island; <i>Veryan Bay</i> (frigate), with Governor on board, visited South Georgia</td></tr>
<tr><td>1952</td><td>Argentine naval expedition</td><td>Carlos A. Viñuales</td><td><i>Hércules</i></td></tr>
<tr><td></td><td></td><td>Domingo G. Luis</td><td><i>Sarandi</i></td></tr>
<tr><td></td><td colspan="3">Visited South Sandwich Islands</td></tr>
<tr><td>1952</td><td colspan="3">Two Argentine Catalina aircraft, commanded by Pedro E. Iraolagoitía and piloted by Edgardo S. Andrew and Guillermo J. Campbell, flew from Rio Grande to Deception Island on 7 February, returning to Buenos Aires on 10 February</td></tr>
</table>

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[1] Leader of 1952 wintering party.
[2] Administrative Officer, South Georgia, acted as leader.
[3] In command of summer operations.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1952	Australian National Antarctic Research Expedition	P. G. Law[1]	
		L. F. Gibbney[2] (Heard Island)	
		J. W. P. McCarthy[2] (Macquarie Island)	
		L. L. Fredriksen	*Tottan*

Two cruises, February to March and March to April, for relief of stations at Heard Island and Macquarie Island; visited Iles de Kerguelen to co-ordinate Antarctic geophysical work with French scientists. Routine observations continued during winter 1952

1952 International Council of Scientific Unions set up committee in May to organize the International Geophysical Year (I.G.Y.), 1957–58; special attention directed to Antarctic research

1952 South African Weather Bureau began in October to collect and rebroadcast weather reports from factory ships operating in South Atlantic and Indian Ocean sectors of Southern Ocean

1952–53	Argentine expedition	Rodolfo N. Panzarini[3]	
		? (Gamma Island)	
		? (Laurie Island)	
		? (Deception Island)	
		? (Paradise Harbour)	
		Juan Carlos Bassini[4] (Barry Island)	
		Juan Carlos Kelly[4] (Hope Bay)	
		? (Half Moon Island)	
		Juan C. Balcazar	*Bahía Buen Suceso*
		Eugenio Fuenterrosa	*Bahía Aguirre*
		Roberto L. Arenas	*Punta Ninfas*
		Carlos A. Brañas	*Chiriguano*
		Ricardo S. FitzSimon	*Sanavirón*
		Alfrain Ledesma	*Yamana*

All existing stations except Barry Island relieved by ship; essential supplies dropped to Barry Island station by Lincoln aircraft during non-stop flight from Rio Gallegos; Half Moon Island hut extended and established as permanent meteorological station and formally inaugurated by Maritime Governor of Tierra del Fuego; refuge hut ("Lasala") built near Whalers Bay, Deception Island (dismantled by British civil authorities in February 1953); several existing refuges temporarily occupied. In winter 1953 sledge journeys made for first time from Hope Bay; refuge hut ("Güemes") built in Duse Bay, Trinity Peninsula; Barry Island sledge parties visited Adelaide Island

1952–53	Chilean expedition	Alberto Kahn Wiegand[3]	
		Ramón Capetillo O.[4] (Greenwich Island)	
		Mario Stock G.[4] (Cape Legoupil)	
		Sergio Espinoza L.[4] (Paradise Harbour)	
		Víctor Wilson	*Iquique*
		Ramon Barros G.	*Maipo*
		Luis Mansilla Y.	*Lientur*
		Reinaldo Roepke R.	*Leucotón*

Three existing stations relieved; refuge hut built in Yankee Harbour, Greenwich Island; second refuge hut built near Whalers Bay, Deception Island (dismantled by British civil authorities in February 1953). In winter 1953 party sledged from Cape Legoupil station to Hope Bay and back

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[1] Leader for both summer cruises.

[2] Leader of 1952 wintering party.

[3] In command of summer operations.

[4] Leader of 1953 wintering party.

<table>
<tr><th><i>Date</i></th><th><i>Nationality, etc.</i></th><th><i>Leader or Commander</i></th><th><i>Ship</i></th></tr>
<tr><td>1952–53</td><td>Falkland Islands Dependencies Survey</td><td>G. W. Marsh[1] (Hope Bay)
W. S. P. Ward[1] (Port Lockroy)
I. W. N. Clarke[1] (Deception Island)
D. A. Barratt[1] (Argentine Islands)
A. G. Tritton[1] (Signy Island)
R. F. Worswick[1] (Admiralty Bay)
—[2] (Grytviken)</td><td></td></tr>
<tr><td></td><td></td><td>W. Johnston</td><td><i>John Biscoe</i></td></tr>
<tr><td></td><td colspan="3">Seven existing stations relieved; at Argentine Islands, site prepared on Galindez Island for construction of new station. In winter 1953 hut built on View Point in Duse Bay and occupied intermittently for meteorological work and survey, James Ross Island survey completed and Borchgrevink Nunatak area resurveyed by Hope Bay parties</td></tr>
<tr><td>1953</td><td colspan="3">Argentine Lincoln and Lancaster aircraft, commanded by Juan Carlos Francisco Fabri, made a number of non-stop flights in January to February from Rio Gallegos, mainly over Deception Island and Melchior Islands</td></tr>
<tr><td>1953</td><td colspan="3">Chilean monoplane, piloted by Luis Alberto Núñez, flew in February from Punta Arenas over Drake Passage, but was forced by bad weather to return when in sight of Deception Island</td></tr>
<tr><td>1953</td><td>British naval expedition</td><td>D. G. D. Hall-Wright</td><td>H.M.S. <i>Snipe</i></td></tr>
<tr><td></td><td></td><td>A. W. F. Sutton</td><td>H.M.S. <i>Bigbury Bay</i></td></tr>
<tr><td></td><td colspan="3"><i>Snipe</i> (sloop) assisted four members of Admiralty Bay station marooned at Point Hennequin; in February supported British civil authorities in removal of Argentine and Chilean huts from Whalers Bay, Deception Island; deported two occupants of Argentine hut to South Georgia; <i>Snipe</i>, and later <i>Bigbury Bay</i> (frigate), remained on patrol in Deception Island waters until mid-April. Royal Marine detachment spent three months on Deception Island</td></tr>
<tr><td>1953</td><td>Australian National Antarctic Research Expedition</td><td>J. Donovan[3]
J. M. Béchervaise[1] (Heard Island)
R. F. M. Dalton[1] (Macquarie Island)</td><td></td></tr>
<tr><td></td><td></td><td>H. C. Andersen</td><td><i>Tottan</i></td></tr>
<tr><td></td><td colspan="3">Two cruises, February to March and March to April, for relief of stations at Heard Island and Macquarie Island. Routine observations continued during winter 1953</td></tr>
<tr><td>1953</td><td colspan="3">Australian Act of 27 March provided for administration of Heard Island and McDonald Islands</td></tr>
<tr><td>1953</td><td>International whale-marking expedition</td><td>Johan T. Ruud</td><td></td></tr>
<tr><td></td><td></td><td>Martin Marthinsen</td><td><i>Enern</i></td></tr>
<tr><td></td><td colspan="3">Whale-marking cruise in Atlantic sector of Southern Ocean in November and December; sponsored by British, Dutch and Norwegian whaling organizations</td></tr>
</table>

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[1] Leader of 1953 wintering party.
[2] Administrative Officer, South Georgia, acted as leader.
[3] Leader for both summer cruises.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1953–54	Argentine expedition	Alicio E. Ogara[1]	
		? (Gamma Island)	
		? (Laurie Island)	
		Alberto Fort[2] (Deception Island)	
		? (Paradise Harbour)	
		Jorge Leal[2] (Barry Island)	
		— Rodrigo[2] (Hope Bay, 1st station)	
		— Castro[2] (Hope Bay, 2nd station)	
		? (Half Moon Island)	
		?	*Bahía Buen Suceso*
		?	*Bahía Aguirre*
		?	*Punta Loyola*
		— Beláustegui	*Chiriguano*
		— Pernice	*Sanavirón*
		?	*Yamana*
		?	*Les Eclaireurs*

Barry Island station relieved by helicopter, other existing stations by ship; second independent station established at Hope Bay; refuge huts built on Ardley Peninsula, King George Island ("Ardley"), in Harmony Cove, Nelson Island ("Francisco de Gurruchaga"), in Brialmont Cove ("Primavera"), Orne Harbour and Paradise Harbour ("Bryde"), Danco Coast, and on Snow Hill Island ("Betbeder"); Potter Cove refuge extended; a number of these and other existing refuges occupied temporarily; coastal surveys made at Deception Island and in Palmer Archipelago; two Catalina aircraft based on Deception Island; Argentine Minister of Marine visited stations in South Shetland Islands and northern Graham Land in *Les Eclaireurs*; Maritime Governor of Tierra del Fuego also toured northern stations. In winter 1954 sledge journeys again made from Hope Bay

1953–54	Chilean expedition	Alfredo López Costa[1]	
		Hernán Sepúlveda G.[2] (Greenwich Island)	
		Luis Arellano S.[2] (Cape Legoupil)	
		Eleuterio Molina B.[2] (Paradise Harbour)	
		Raul del Solar Grove	*Covadonga*
		Vicente Reyes	*Rancagua*
		Mario Mutis	*Lientur*
		Patricio Carvajal Prado	*Lautaro*

Three existing stations relieved; reconnaissance seaplanes assisted for the first time by a helicopter

1953–54	Falkland Islands Dependencies Survey	W. Turner[2] (Hope Bay)	
		F. G. Bird[2] (Port Lockroy)	
		G. E. Hemmen[2] (Deception Island)	
		R. A. Lenton[2] (Argentine Islands)	
		H. Smith[2] (Signy Island)	
		D. J. George[2] (Admiralty Bay)	
		D. Borland[2] (Grytviken)	
		W. Johnston	R.R.S. *John Biscoe*

Seven existing stations relieved; at Argentine Islands, new station on Galindez Island constructed and occupied in winter 1954 (replacing Winter Island station); South Georgia whaling stations visited; Deception Island and

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[1] In command of summer operations.
[2] Leader of 1954 wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1953–54	Falkland Islands Dependencies Survey (*cont.*) Joinville Island surveyed by summer parties; South Sandwich Islands examined. In winter 1954 Hope Bay parties began large-scale local topographical survey, occupying View Point hut semi-permanently in March to November and making provision depot at Seal Nunataks		
1953–54	Australian National Antarctic Research Expedition First cruise, in December 1953, relieved station at Macquarie Island. Second cruise, in January to March 1954, relieved station at Heard Island. In February 1954 a new station was established at Mawson, MacRobertson Land; during return voyage the ship visited the Vestfold Hills area of Princess Elizabeth Land, where magnetic and solar observations were made, and called at Iles de Kerguelen. During winter 1954 sledge and tractor journeys were made from Mawson to Scullin Monolith, to King Edward VIII Gulf and within sight of Prince Charles Mountains. In August 1954 it was decided to close the Heard Island station; scientific work ceased on 31 October. Routine observations continued at Macquarie Island during winter 1954	P. G. Law[1] G. Budd[2] (Heard Island) K. R. Campbell[2] (Macquarie Island) R. G. Dovers[2] (Mawson) H. C. Petersen	 *Kista Dan*
1953–54	British naval expedition *Nereide* (frigate), with Governor of Falkland Islands, visited South Georgia whaling stations and British and foreign stations in South Orkney and South Shetland Islands; in March 1954 *St Austell Bay* (frigate) escorted Argentine Minister of Marine (in *Les Eclaireurs*) throughout his tour of Argentine Antarctic stations. Royal Marine detachment spent about four months on Deception Island	P. R. H. Harrison D. C. H. Ward	H.M.S. *Nereide* H.M.S. *St Austell Bay*
1953–54	South Georgia Survey (2nd season) Summer topographical and geological survey of island continued	V. D. Carse	—
1953–55	B. Stonehouse and W. N. Bonner of F.I.D.S. made biological observations and collections in South Georgia		
1954	Australian Antarctic Territory Act of 1 November specified laws applicable in the Territory		
1954	International whale-marking expedition Whale-marking cruise in Atlantic sector of Southern Ocean in November and December; sponsored by British and Norwegian whaling organizations	Martin Marthinsen	*Enern*
1954	Argentine Lincoln and Lancaster aircraft made a number of non-stop flights in November to December from Rio Gallegos over Deception Island and Melchior Islands		
1954–55	United States naval expedition Preliminary reconnaissance of ice conditions, and possible station sites for United States participation in International Geophysical Year, 1957–58. Ross Ice Front examined and former natural harbours at Bay of Whales and Discovery Inlet found to be temporarily unusable. Ice front of Kronprinsesse Märtha Kyst searched for landing places between longs. 0° 30′ W. and 20° W. Limited scientific programme	Glen Jacobsen	U.S.S. *Atka*

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[1] Leader for both summer cruises.

[2] Leader of 1954 wintering party.

Date	Nationality, etc.	Leader or Commander	Ship
1954–55	Chilean expedition	Jorge Gándara Bofil[1]	
		Galvarino Sazo L.[2] (Greenwich Island)	
		Luis Valdés L.[2] (Cape Legoupil)	
		Orlando Pérez S.[2] (Paradise Harbour)	
		Hernán del Río[2] (Deception Island)	
		?	*Covadonga*
		Ramon Pinochet	*Maipo*
		German Valenzuela	*Leucotón*
		Hernán Prat	*Lautaro*

Three existing stations relieved; new station ("Pedro Aguirre Cerda") established at Pendulum Cove, Deception Island, South Shetland Islands

1954–55	Argentine expedition	Alicio E. Ogara[1]	
		? (Gamma Island)	
		? (Laurie Island)	
		? (Deception Island)	
		? (Paradise Harbour)	
		? (Barry Island)	
		? (Hope Bay)	
		? (Half Moon Island)	
		Hernán Pujato[2] (Filchner Ice Shelf)	
		Luis T. de Villalobos	*General San Martín*
		Aurelio C. Lopez de Bertodano	*Bahía Buen Suceso*
		Benigno I. Varela	*Bahía Aguirre*
		Jorge Federico Pablo Wicht	*Punta Loyola*
		Hector A. Suffern Moine	*Sanavirón*
		Adolfo V. R. Bluthgen	*Chiriguano*
		Antonio Revuelto	*Yamana*

All existing stations relieved; new meteorological station ("General Belgrano") established on Filchner Ice Shelf during first cruise of icebreaker *General San Martín*, and oceanographical and survey work carried out in Coats Land and Weddell Sea. Refuge huts built in Mikkelsen Harbour, Trinity Island, on Petermann Island ("Groussac") off Graham Coast, in Dorian Bay, Wiencke Island, and on Thule Island, South Sandwich Islands ("Teniente Esquivel"); seven existing refuge huts occupied temporarily, including Potter Cove where aircraft were based; helicopters photographed South Sandwich Islands from air; Maritime Governor of Tierra del Fuego visited stations in South Shetland Islands and northern Graham Land. In winter 1955 Hope Bay personnel built three refuge huts—in Duse Bay ("Cristo Redentor"), on Tabarin Peninsula ("Antonio Moro"), and on Persson Island ("Libertador"); Barry Island personnel built refuge on Northeast Glacier ("Yapeyú")

1954–55	Falkland Islands Dependencies Survey	W. E. Anderson[2] (Hope Bay)	
		A. M. Carroll[2] (Port Lockroy)	
		C. H. Palmer[2] (Deception Island)	
		R. V. Hesketh[2] (Argentine Islands)	
		H. Dollman[2] (Signy Island)	
		J. R. Noble[2] (Admiralty Bay)	
		? (Grytviken)	
		P. R. Hooper[2] (Anvers Island)	
		K. M. Gaul[2] (Horsehoe Island)	
		W. Johnston	R.R.S. *John Biscoe*
		O. Johannessen	*Norsel*

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[1] In command of summer operations.

[2] Leader of 1955 wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1954–55	Falkland Islands Dependencies Survey (*cont.*)		
	Seven existing stations relieved by *John Biscoe*; party landed in Biscoe Bay, Anvers Island, to reconnoitre site for new station, but found no access to interior; new stations established in Arthur Harbour, Anvers Island (Base N) and on Horseshoe Island in Marguerite Bay (Base Y) by *Norsel*; Johannessen Harbour in Martin Islands, and Gerlache Strait area surveyed. In winter 1955 Hope Bay parties continued local survey, occupied View Point hut in January to November, resurveyed east coast of Graham Land between Cape Fairweather and Cape Alexander, and studied problems of cold acclimatization and dog physiology; Anvers Island survey began in August, and Horseshoe Island parties initiated meteorological, survey and geological programme		
1954–55	Australian National Antarctic Research Expedition	P. G. Law[1] J. Donovan[2] M. Hynes[3] (Macquarie Island) J. M. Béchervaise[3] (Mawson) H. C. Petersen	 *Kista Dan*
	First cruise, in December 1954 to January 1955, relieved station at Macquarie Island. Second cruise, in January to March 1955, relieved station at Mawson; the programme of summer exploration of Princess Elizabeth Land was continued, scientific parties working on Magnetic Island, in the Vestfold Hills, and in Prydz Bay; the Heard Island station was finally evacuated on 9 March. During winter 1955 the scientific programme at Mawson was expanded and automatic meteorological stations were established at Mount Henderson and on an island six miles off Mawson; sledge and tractor journeys were made from Mawson towards Scullin Monolith for biological work, to Prince Charles Mountains for geological work and survey and to the David, Masson and Casey Ranges, also for geological work		
1954–55	British naval expedition	L. R. P. Lawford P. D. Hoare	H.M.S. *Veryan Bay* H.M.S. *Burghead Bay*
	Veryan Bay (frigate) visited South Georgia whaling stations, and British and foreign stations in South Orkney and South Shetland Islands, accompanied by Governor of Falkland Islands; *Burghead Bay* (frigate) visited South Orkney and South Shetland Islands		
1954–55	British South Georgia Expedition	G. A. Sutton	—
	Unsuccessful attempt to climb Mount Paget, but several other first ascents made		
1955	South African naval expedition	P. Dryden-Dymond	H.M.S.A.S. *Transvaal*
	Reconnaissance survey of Bouvetøya in January to February, initiated by South African Weather Bureau, again investigated possibility of establishing meteorological station on the island for I.G.Y., 1957–58; concluded that there are two possible sites, but South African Government decided not to proceed with project		
1955	United Kingdom Government made unilateral application in May to International Court of Justice instituting proceedings against Argentina and Chile about their encroachments in the Falkland Islands Dependencies. Neither Argentina nor Chile would accept jurisdiction of the Court in this dispute		

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[1] Leader of second summer cruise.
[2] Leader of first summer cruise.
[3] Leader of 1955 wintering party.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
955	Argentine Government Decree of 23 May transferred administrative responsibility for Antarctic territories claimed by Argentina to Maritime Governor of Tierra del Fuego. On 28 June a new Argentine Province was established extending southwards from lat. 46° S. to South Pole, including Falkland Islands, South Georgia, South Sandwich Islands, South Orkney Islands, South Shetland Islands and Antarctic mainland between longs. 25° and 74° W.		
955	Chilean Law of 17 June incorporated Antarctic territories claimed by Chile in Province of Magallanes and provided for their administration in accordance with a Statute subsequently issued on 17 July 1956		
955	French Law of 6 August created new autonomous French Overseas Territory, "Terres Australes et Antarctiques Françaises", consisting of Ile Saint-Paul, Ile Amsterdam, Iles Crozet, Iles de Kerguelen and Terre Adélie, and transferred administrative responsibility from Madagascar (see 1924) to Paris. Decrees of 13 January and 18 September 1956 established the new administrative organization		
1955	United States Government set up "United States Antarctic Programs" in October to co-ordinate and organize all United States operations in the Antarctic and to advise the government on policy		
1955	Chilean air force Catalina flew on 28 December from Punta Arenas to Deception Island and back		
1955–56	Chilean expedition	Alfredo Martínez Díaz[1]	
		Julio Tagle B.[2] (Greenwich Island)	
		Guillermo Chacón P.[2] (Cape Legoupil)	
		Ernesto L. Galez G.[2] (Paradise Harbour)	
		Hugo Sage S.[2] (Deception Island)	
		Wilfredo Bravo	*Baquedano*
		Juan Otazo Kelly	*Rancagua*
		?	*Lientur*
		?	*Leucotón*
	Four existing stations relieved; possibilities for scientific work during forthcoming I.G.Y. reviewed; Peter I Øy visited and landing made in Sandefjordbukta		
955–56	United States I.G.Y. expedition (Operation "Deep Freeze I")	Richard E. Byrd[1] (5th expedition)	
		George J. Dufek[3]	
		H. W. Whitney[2] ("Little America V")	
		D. W. Canham[2] ("Williams Air Operations Facility")	
		?	U.S.C.G. *Eastwind*
		?	U.S.S. *Edisto*
		?	U.S.S. *Glacier*
		?	U.S.S. *Arneb*

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[1] In command of summer operations.
[2] Leader of 1956 wintering party.
[3] In command of U.S. Navy Task Force 43.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1955–56	United States I.G.Y. expedition (*cont.*)	?	U.S.N.S. *Greenville Victory*
		?	U.S.S. *Wyando*
		?	U.S.S. *Nespelen*

I.G.Y. station "Little America V" established near Kainan Bay on Ross Ice Shelf, and operational support base, "Williams Air Operations Facility", at Hut Point, Ross Island; two Neptune and two Skymaster aircraft flew from New Zealand to air-strip on sea ice in McMurdo Sound, and subsequently made nine long-range exploratory flights to various points on the continent, including southern extremity of Weddell Sea; sledge parties from "Little America V" made unsuccessful attempt to establish second I.G.Y. station in Marie Byrd Land; ships reconnoitred possible sites for "Adare" and "Wilkes" I.G.Y. stations in Victoria Land and Wilkes Land, respectively; brief landings made in Dronning Maud Land. [For continuation see annual entries below]

1955–56	Argentine expedition	Emilio L. Díaz[1]	
		? (Gamma Island)	
		? (Laurie Island)	
		? (Deception Island)	
		? (Paradise Harbour)	
		— Elisagaray[2] (Barry Island)	
		? (Hope Bay)	
		? (Half Moon Island)	
		Hernán Pujato[2] ("General Belgrano")	
		Luis M. Iriate	*General San Martín*
		David O. Funcia	*Bahía Aguirre*
		Juan C. Kelly	*Chiriguano*
		?	*Punta Ninfas*

Eight existing stations relieved; seven refuge huts temporarily occuped; refuge hut built on Watkins Island, Biscoe Islands ("Capitán Estivariz"). Early in 1956 two small aircraft made reconnaissance flights southwards from Filchner Ice Shelf station to lat. 83° S. In winter 1956 further sledge journeys made from Hope Bay and Barry Island, and three new refuge huts built—one on Robertson Island ("San Roque") and two in Bills Gulch area ("Chacabuco" and "Maipú")

1955–56	Falkland Islands Dependencies Survey	R. F. Worswick[2] (Hope Bay)	
		A. M. Carroll[2] (Port Lockroy)	
		P. Guyver[2] (Deception Island)	
		N. A. Hedderley[2] (Argentine Islands)	
		W. L. N. Tickell[2] (Signy Island)	
		C. C. Clement[2] (Admiralty Bay)	
		? (Grytviken)	
		P. R. Hooper[2] (Anvers Island)	
		D. J. H. Searle[2] (Horseshoe Island)	
		R. A. Foster[2] (Danco Island)	
		T. L. Murphy[2] (Detaille Island)	
		N. R. Brown	R.R.S. *John Biscoe*[3]
		W. Johnston	R.R.S. *Shackleton*

Nine existing stations relieved; South Georgia whaling stations visited; *John Biscoe* established new meteorological station on Detaille Island off Loubet Coast (Base W); *Shackleton* searched unsuccessfully for station site on Brabant

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[1] In command of summer operations.

[2] Leader of 1956 wintering party.

[3] Renamed *Pretext* at end of summer season: later became H.M.N.Z.S. *Endeavour*.

<table>
<tr><th>Date</th><th>Nationality, etc.</th><th>Leader or Commander</th><th>Ship</th></tr>
<tr><td>1955–56</td><td>Falkland Islands Dependencies Survey (cont.)</td><td></td><td></td></tr>
<tr><td></td><td colspan="3">Island; subsequently established new meteorological station on Danco Island off Danco Coast (Base O); examined Stonington Island station (evacuated in 1950); Coronation Island partially surveyed by summer party; Sandefjord Bay hut found wrecked. In winter 1956 radio-sonde observations begun at Argentine Islands; refuge hut built on Doumer Island; survey and geological programmes initiated at Danco Island and Detaille Island stations, and possible routes to Graham Land plateau reconnoitred; survey programmes at Hope Bay, Anvers Island and Horseshoe Island continued</td></tr>
<tr><td>1955–56</td><td>Australian National Antarctic Research Expedition</td><td>P. G. Law[1]
J. Donovan[2]
I. L. Adams[3] (Macquarie Island)
W. Bewsher[3] (Mawson)</td><td></td></tr>
<tr><td></td><td></td><td>H. C. Petersen</td><td>Kista Dan</td></tr>
<tr><td></td><td colspan="3">First cruise, in December 1955, relieved station at Macquarie Island. During second cruise, in December 1955 to March 1956, sea and air explorations were made of the coast of Wilkes Land, landings being made in Davis Bay, on one of the Balaena Islets, on the Windmill Islands and on the coast to the northwest; the Soviet I.G.Y. station "Mirnyy" was visited. During winter 1956 seismology and upper wind measurements were added to the scientific programme at Mawson, and exploration from that station was extended by the employment for the first time of an air unit which made photographic reconnaissance surveys and depot-laying flights totalling 50,000 miles; sledge and tractor journeys were continued from Mawson, mainly for geological work and survey, to Masson Range, to Taylor Glacier and to Prince Charles Mountains</td></tr>
<tr><td>1955–56</td><td>Soviet I.G.Y. expedition</td><td>M. M. Somov[4] ("Mirnyy")
A. M. Gusev[3] ("Pionerskaya")
P. Tselishchev[5] ("Oazis")</td><td></td></tr>
<tr><td></td><td></td><td>I. A. Man</td><td>Ob'</td></tr>
<tr><td></td><td></td><td>A. I. Vetrov</td><td>Lena</td></tr>
<tr><td></td><td></td><td>M. A. Tsygonkov</td><td>Refrigerator ship No. 7</td></tr>
<tr><td></td><td colspan="3">I.G.Y. station "Mirnyy" established on mainland of Queen Mary Land opposite Haswell Island; reconnaissance flights made over Knox Coast and to South Geomagnetic Pole area; Ob' made oceanographical cruise in Southern Ocean. In winter 1956 construction of "Mirnyy" completed and scientific programme initiated; in May operational support station "Pionerskaya" established by sledge parties, with assistance of aircraft, in lat. 69° 44′ S., long. 95° 30′ E.; in October new scientific station ("Oazis") established entirely by air in about lat. 66° 30′ S., long. 101° E. [For continuation see annual entries below]</td></tr>
<tr><td>1955–56</td><td>Falkland Islands and Dependencies Aerial Survey Expedition (1st season)</td><td>P. G. Mott
J. H. Saffery[6]</td><td></td></tr>
<tr><td></td><td></td><td>J. C. Ryge</td><td>Oluf Sven</td></tr>
<tr><td></td><td colspan="3">Hunting Aerosurveys Ltd., under contract from British Colonial Office, initiated programme of vertical air photography of South Shetland Islands and northern Graham Land with Canso flying boats based at Deception Island; helicopters used to assist ground control parties; two Canso aircraft flew from Canada to Deception Island and back; photographed about 1200 square miles</td></tr>
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[1] Leader for second summer cruise.
[2] Leader for first summer cruise.
[3] Leader of 1956 wintering party.
[4] In overall command during 1956.
[5] Leader from October 1956.
[6] Flying Manager.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1955–56	British naval expedition	J. V. Wilkinson	H.M.S. *Protector*
	Visited British and foreign stations in South Shetland Islands and Graham Land; made ice reconnaissance in Weddell Sea to assist Trans-Antarctic Expedition ship *Theron* which was beset; helicopters also used to reconnoitre site for new F.I.D.S. station on Danco Coast, to transport Royal Marine detachment to and from Anvers Island for training ashore, and to assist search for Argentine seaman reported adrift from Hope Bay; inspected Argentine hut on Thule Island, South Sandwich Islands; landed on Saunders Island; made first helicopter landing on Visokoi Island, and photographed Bristol, Montagu and Saunders Islands from air		
1955–56	British Royal Society I.G.Y. expedition	David Dalgliesh Leif Jakobsen	 *Tottan*
	I.G.Y. station established near Halley Bay on Caird Coast of Coats Land; ship also visited South Georgia. During winter 1956, construction of station completed by advance party, and pilot scientific programme initiated. [For continuation see annual entries below]		
1955–56	South Georgia Survey (3rd season)	V. D. Carse	—
	Summer topographical survey of island continued		
1955–56	Mitsuji Matsumoto, captain-designate of Japanese I.G.Y. expedition ship *Soya*, with chief engineer and navigator, accompanied Japanese whaling fleet to Southern Ocean; reconnoitred Prins Harald Kyst of Dronning Maud Land for site for proposed Japanese I.G.Y. station		
1955–58	British Commonwealth Trans-Antarctic Expedition	V. E. Fuchs[1] Sir Edmund Hillary[2] Harald Marø H. C. Petersen H. Kirkwood	 *Theron* *Magga Dan*[3] H.M.N.Z.S. *Endeavour*
	In January and February 1956 *Theron* established "Shackleton" base in lat. 77° 59′ S., long. 37° 10′ W., on Filchner Ice Shelf; in same season three New Zealanders accompanied United States Operation "Deep Freeze I" to reconnoitre McMurdo Sound area of Ross Sea for base site for New Zealand party. In 1956–57 *Magga Dan* transported main crossing party to "Shackleton". Reconnaissance and survey sledge journeys were made in Coats Land; in April 1957 aircraft of Royal Air Force detachment established "South Ice" advance base, 300 miles inland from "Shackleton". The same season *Endeavour* established New Zealand support party at "Scott" base on Pram Point, Ross Island; aircraft and sledge parties reconnoitred route into interior of Victoria Land. In October 1957 to January 1958 New Zealand support party pioneered overland route from "Scott" base to South Pole which was reached on 5 January; Antarctic continent crossed overland from "Shackleton" base to "Scott" base between 24 November 1957 and 2 March 1958, United States "Amundsen–Scott" South Pole station being visited on the way on 20–24 January 1958; single-engined Otter aircraft, piloted by J. H. Lewis, flew across continent from "South Ice" to "Scott" base on 6 January 1958. Seismic soundings, gravity traverse, glaciology, meteorology and geology carried out during crossing; topographical surveys made by New Zealand party in Victoria Land		

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[1] Leader of whole expedition.

[2] Leader of New Zealand support party.

[3] Also carried relief party and stores for British Royal Society I.G.Y. expedition.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1955–	French I.G.Y. expedition	Bertrand Imbert[1]	
		Robert Guillard[2]	
		J. Dubois[3]	
		?	*Norsel*

In January 1956 an I.G.Y. station, "Base Dumont d'Urville", was established on Ile des Pétrels, Terre Adélie; late in winter 1956 a limited programme of survey, meteorology and biological work was inaugurated there. In December 1956 station relieved; in January 1957 second I.G.Y. station, "Station Charcot", established in lat. 69° 22′ S., long. 139° 02′ W., near South Magnetic Pole. During return voyage in 1957 *Norsel* made hydrographic observations between lats. 64° S. and 61° S.

1956	Douglas DC 6 B of Chilean National Airline (LAN) flew non-stop from Chabunco over Chilean Antarctic stations on 22 December, the first Antarctic tourist flight		

1956–57	Chilean expedition	Alejandro Navarrete Torres[4]	
		Edgardo T. Apel[5] (Greenwich Island)	
		Luis A. Ovando Palet[5] (Cape Legoupil)	
		Vicente Rodríguez Bustos[5] (Paradise Harbour)	
		Mario Jiménez Vargas[5] (Deception Island)	
		Jorge Paredes W.	*Baquedano*
		Eduardo Beeche R.	*Rancagua*
		Hernán Bravo S.	*Angamos*
		Jorge Thornton S.	*Lientur*
		?	*Lautaro*

Four existing stations relieved, and extended to accommodate wintering I.G.Y. scientists; summer scientific parties made geophysical, glaciological and biological observations. From 1 July 1957 all four stations planned to take part in I.G.Y. programme—Greenwich Island and Deception Island (meteorology), Cape Legoupil (meteorology, geophysics, glaciology) and Paradise Harbour (meteorology, geophysics)

1956–57	British Royal cruise	Prince Philip	
		Peter Mitchell[6]	H.M. Yacht *Britannia*

H.R.H. Prince Philip, Duke of Edinburgh, accompanied by the Governor of the Falkland Islands, visited British stations in South Shetland Islands and west Graham Land in January 1957. Royal party transferred from *Britannia* to *John Biscoe* for part of this cruise, escorted by *Protector*. Also visited South Georgia

1956–57	New Zealand I.G.Y. expedition	T. Hatherton[5]	
		H. Kirkwood	H.M.N.Z.S. *Endeavour*

The five members of this expedition wintered at "Scott" base on Pram Point, Ross Island, with New Zealand party of Commonwealth Trans-Antarctic Expedition; took part in the I.G.Y. scientific programme

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[1] Leader of 1955–56 summer party and of 1957 wintering party at "Base Dumont d'Urville".

[2] Leader of 1956 wintering party at "Base Dumont d'Urville".

[3] Leader of 1957 wintering party at "Station Charcot".

[4] In command of summer operations.

[5] Leader of 1957 wintering party.

[6] Navigating officer.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	Argentine expedition	Helvio N. A. Guozden[1]	
		Miguel J. Guruceaga[2] (Laurie Island)	
		A. A. Giuntini[2] (Gamma Island)	
		Z. S. Bolino[2] (Deception Island)	
		E. J. Sgandurra[2] (Paradise Harbour)	
		? (Barry Island)	
		? (Hope Bay)	
		González Silvano[2] (Half Moon Island)	
		— Léal[2] ("General Belgrano")	
		Jorge A. Boffi	*General San Martín*
		José C. T. Carbone	*Bahía Aguirre*
		?	*Bahía Thetis*
		Enrique I. Paquien	*Les Eclaireurs*
		Angel L. Bernasconi	*Chiriguano*
		Eduardo H. Fraga	*Sanavirón*
		?	*Punta Ninfas*
		?	*Punta Loyola*

Eight existing stations relieved; refuge hut built on Rabot Island in Biscoe Islands ("Cadete Guillochon"). Contra-Almirante Rojas, Argentine Chief of Naval Operations, inspected stations in South Shetland Islands and northern Graham Land. All eight stations took part in I.G.Y. programme—Laurie Island and Hope Bay (meteorology, geomagnetism, glaciology, oceanography), Gamma Island, Barry Island and Half Moon Island (meteorology, glaciology, oceanography), Deception Island and "General Belgrano" (meteorology, geomagnetism, ionospheric observations, glaciology, oceanography) and Paradise Harbour (meteorology, geomagnetism, glaciology)

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	United States I.G.Y. expedition (Operation "Deep Freeze II")	George J. Dufek[3]	
		Albert P. Crary[4] ("Little America V")	
		R. E. Anderson[4] ("Williams Air Operations Facility")	
		Paul A. Siple[4] ("Amundsen-Scott" station)	
		G. R. Toney[4] ("Byrd" station)	
		C. R. Eklund[4] ("Wilkes" station)	
		Finn Ronne[4] ("Ellsworth" station)	
		B. J. Lauff	U.S.S. *Glacier*
		C. Bulfinch	U.S.S. *Atka*
		J. B. Elliot	U.S.S. *Staten Island*
		J. A. Bresnan	U.S.C.G. *Northwind*
		N. C. Johnson	U.S.S. *Arneb*
		F. M. Gambacorta	U.S.S. *Wyandot*
		C. T. Fritter	U.S.S. *Curtiss*
		G. C. Sup	U.S.S. *Nespelen*
		L. Duchowski	U.S.N.S. *Greenville Victory*
		R. C. Dollar	U.S.N.S. *Private Joseph F. Merrell*
		J. Wiss	U.S.N.S. *Private John R. Towle*

Two existing stations relieved; four new I.G.Y. stations established: "Amundsen–Scott" station at South Geographical Pole (supplied entirely by air); "Byrd" station at lat. 79° 59′ S., long. 120° 01′ W., in Marie Byrd Land

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[1] In command of summer operations.
[2] Leader of 1957 wintering party.
[3] In command of U.S. Navy Task Force 43.
[4] Scientific leader in winter 1957.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	United States I.G.Y. expedition (*cont.*)		

(supplied overland from "Little America V"); "Wilkes" station in Vincennes Bay, Budd Coast, and "Ellsworth" station in lat. 77° 43′ S., long. 41° 08′ W., on Filchner Ice Shelf (both supplied by sea). An auxiliary air support station on Ross Ice Shelf at foot of Liv Glacier occupied October 1956 to February 1957 as refuelling point for South Pole flights. Scientific programmes at all I.G.Y. stations included geophysics, meteorology, and glaciology and, at all but "Little America V" and "Ellsworth" stations (both on ice shelves), seismology; sledging programmes from all stations included glaciology, meteorology, gravity and seismology

1956–57	New Zealand oceanographical expedition	W. J. Brown R. T. Hale	H.M.N.Z.S. *Hawea* H.M.N.Z.S. *Pukaki*

After escorting *Endeavour* to lat. 67° 30′ S., long. 179° 58′ E. (about 30 miles inside pack ice), these two frigates undertook oceanographical investigations north of Scott Island, where an attempt to land was unsuccessful

1956–57	Falkland Islands Dependencies Survey	L. Rice[1] (Hope Bay)	
		C. C. Clement[1] (Port Lockroy)	
		J. Paisley[1] (Deception Island)	
		D. Emerson[1] (Argentine Islands)	
		C. D. Scotland[1] (Signy Island)	
		A. Precious[1] (Admiralty Bay)	
		? (Grytviken)	
		J. W. Thompson[1] (Anvers Island)	
		P. Guyver[1] (Horseshoe Island)	
		R. A. Foster[1] (Danco Island)	
		A. B. Erskine[1] (Detaille Island)	
		R. Miller[1] (Prospect Point)	
		W. Johnston	R.R.S. *John Biscoe*[2]
		N. R. Brown	R.R.S. *Shackleton*

Eleven existing stations relieved; South Georgia whaling stations visited. In January 1957 H.R.H. Prince Philip joined *John Biscoe* for tour of F.I.D.S. stations. New station established on Prospect Point, Graham Coast (Base J); three refuge huts built—at Cape Reclus on Danco Coast, close east of Detaille Island on Loubet Coast, and on Blaiklock Island in Marguerite Bay. In winter 1957 survey and geological programme initiated at Prospect Point station; surveys of Anvers Island and Coronation Island completed; sledge parties linked surveys between Detaille Island and Horseshoe Island stations, and between Hope Bay station and Cape Reclus refuge. Ten F.I.D.S. stations took part in I.G.Y. programme—Hope Bay, Deception Island, Signy Island, Horseshoe Island, Detaille Island and Prospect Point (meteorology), Port Lockroy (ionospheric observations), Argentine Islands (meteorology, geomagnetism, oceanography, seismology), Admiralty Bay (meteorology, glaciology) and Grytviken (meteorology, oceanography)

956–57	Australian National Antarctic Research Expedition	P. G. Law[3]	
		J. Donovan[4]	
		H. P. Black[1] (Macquarie Island)	

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[1] Leader of 1957 wintering party.
[2] A new vessel; launched in June 1956 and first commissioned for 1956–57 season.
[3] Leader for second summer cruise.
[4] Leader for first summer cruise.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	Australian National Antarctic Research Expedition (*cont.*)	K. B. Mather[1] (Mawson) W. R. J. Dingle[1] (Davis) K. Hindberg	 *Kista Dan*

First cruise, in November to December 1956, relieved station at Macquarie Island. Second cruise, in December 1956 to March 1957, relieved Mawson and established a new station at Davis, in Princess Elizabeth Land, in January; continued coastal air reconnaissance; ship also visited Vincennes Bay in Wilkes Land, and Iles de Kerguelen. During winter 1957 comprehensive scientific programmes for the I.G.Y. were inaugurated at all three Australian stations

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	British Royal Society I.G.Y. expedition	Robin Smart[1] H. C. Petersen Leif Jakobsen	 *Magga Dan*[2] *Tottan*

Advance party at Halley Bay relieved, and main scientific team installed. I.G.Y. scientific programme included meteorology, geomagnetism, seismology, glaciology and ionospheric observations.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	Soviet I.G.Y. expedition	A. F. Treshnikov[3] ("Mirnyy") N. Rusin[4], G. Paschenko[5] ("Pionerskaya") G. Paschenko[1] ("Oazis") V. S. Pelevin[1] ("Komsomol'skaya") V. G. Aver'yanov[1] ("Vostok-I") I. A. Man A. I. Vetrov A. S. Yantslevich	 *Ob'* *Lena* *Kooperatsiya*

Three existing stations relieved; new operational support station "Komsomol'skaya" established in about lat. 74° S., long. 99° E.; sledge party attempting to reach area of proposed I.G.Y. station "Vostok" in South Geomagnetic Pole area forced to winter short of objective in about lat. 72° S., long. 97° E. (this site was known as "Vostok-I"); other sledge parties made geological, glaciological and seismic observations; air survey team fixed astronomical points and made airborne magnetometer survey; *Ob'* and *Lena* made extensive oceanographical observations in Southern Ocean. Scientific programme at "Mirnyy" included geophysics, meteorology, glaciology and seismology. On 1 December 1957 "Vostok-I" closed; on 16 December I.G.Y. station "Vostok" established in lat. 78° 30′ S., long. 107° E. "Sovetskaya" I.G.Y. station has since been established (16 February 1958) in lat. 78° 24′ S., long. 87° 35′ E., about 400 miles short of planned position at "Pole of Relative Inaccessibility"

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	Falkland Islands and Dependencies Aerial Survey Expedition (2nd season)	P. G. Mott J. H. Saffery[6] J. C. Ryge	 *Oluf Sven*

Hunting Aerosurveys Ltd., under contract from British Colonial Office, continued air photography and survey programme started in 1955–56, again based on Deception Island; helicopters used to assist ground control parties; two Canso aircraft flew from Canada to Deception Island and back; photographed about 33,000 square miles of South Shetland Islands and west Graham Land southwards to lat. 68° S.

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[1] Leader of 1957 wintering party.

[2] Also carried relief party and stores for Commonwealth Trans-Antarctic Expedition.

[3] In overall command during 1957.

[4] Leader November 1956 to February 1957.

[5] Leader briefly in February 1957 (subsequently transferred to "Oazis").

[6] Flying Manager.

Date	*Nationality, etc.*	*Leader or Commander*	*Ship*
1956–57	Norwegian I.G.Y. expedition	Sigurd Helle[1]	
		John Jakobsen	*Polarsirkel*
		Bern Brandal	*Polarbjørn*
	I.G.Y. station established in lat. 70° 30′ S., long. 2° 32′ W., on Kronprinsesse Märtha Kyst of Dronning Maud Land. Scientific programme included geophysics, meteorology and glaciology. Survey team established second station in January 1958, 200–250 miles inland		
1956–57	British naval expedition	J. V. Wilkinson	H.M.S. *Protector*
	Visited Hanusse Bay to collect F.I.D.S. personnel stranded on Roux Island, and returned them to Detaille Island station by helicopter. Visited South Georgia; made first landing on Vindication Island, South Sandwich Islands, by helicopter, and photographed other islands in group from air; helped with relief of F.I.D.S. stations; escorted *Britannia* during H.R.H. Prince Philip's tour of Falkland Islands Dependencies in January 1957. Admiralty hydrographic survey unit, led by C. J. C. Wynne-Edwards, charted Bismarck Strait area		
1956–57	Japanese I.G.Y. expedition	Takeshi Nagata[2]	
		Eizaburo Nishibori[1] ("Syowa")	
		Mitsuji Matsumoto	*Soya*
		?	*Umitaka Maru*
	I.G.Y. station "Syowa" established on Ongul in Lützow-Holmbukta, Prins Harald Kyst. Ships beset in pack ice in late February 1957 but freed by Soviet *Ob'* on 1 March; made oceanographical observations in Southern Ocean. Scientific programme at "Syowa" included geophysics, meteorology and glaciology		
1956–57	South Georgia Survey (4th season)	V. D. Carse	—
	V. D. Carse returned alone to complete topographical survey of island initiated in 1951		
1956–	R. A. Brown and J. Smith started glaciological investigations in South Georgia in January 1957 as part of British contribution to I.G.Y.		
1957	United States/New Zealand I.G.Y. expedition	J. A. Shear[3]	
		J. A. Bresnan	U.S.C.G. *Northwind*
		N. C. Johnson	U.S.S. *Arneb*
	In January 1957 joint United States/New Zealand I.G.Y. station "Adare" established at Cape Hallett in Victoria Land; also planned as emergency air strip for United States aircraft flying between New Zealand and McMurdo Sound. Scientific programme included meteorology, ionospheric observations, seismology and geomagnetism		
1957–58	Belgian I.G.Y. expedition	Gaston de Gerlache de Gomery	
		Sigmund Böe	*Polarhav*
		John Jakobsen	*Polarsirkel*
	I.G.Y. station, "Base Roi Baudouin", established 10 miles inland from Breidvika on Prinsesse Ragnhild Kyst, Dronning Maud Land. Scientific programme included geophysics, meteorology and glaciology		

(The list concludes at the beginning of the International Geophysical Year in July 1957, but a few later notes have been added to cover the establishment of all the I.G.Y. stations.)

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[1] Leader of 1957 wintering party.

[2] In command of summer operations.

[3] Scientific leader in winter 1957.

FIELD WORK

GEOLOGICAL WORK IN NORTH-WEST ELLESMERE ISLAND AND AXEL HEIBERG ISLAND, 1956 AND 1957

[Summarized from *Arctic Circular*, Vol. 9, No. 4, 1956, p. 56–57 and Vol. 10, No. 2, 1957, p. 20–22.]

1956

R. Thorsteinsson and E. T. Tozer of the Geological Survey of Canada worked in north-west Ellesmere Island and Axel Heiberg Island from April to September 1956. They were taken from Churchill to Resolute, where they were joined by two Eskimo and their dog teams, and on to Eureka weather station on Slidre Fiord by the R.C.A.F. during the regular Spring air lift. Late in April overland trips were made to lay food depots for summer use near mountains about 30 miles east of Eureka. During May and June they sledged along the coasts of Ellesmere Island and Axel Heiberg Island visiting Eureka Sound, Nansen Sound, Otto Fiord, Hare Fiord, Borup Fiord and Greely Fiord, also part of Canyon Fiord and the Buchanan Lake region of Axel Heiberg Island. The break-up then began and from 4 July to 7 August they worked in the Fosheim Peninsula, travelling on foot and making use of the depots laid earlier in the year. On 2 August the geologists left Eureka for Bay Fiord in a 22 ft. freighter canoe with a 9·7 h.p. motor. Ice conditions in Eureka Sound delayed progress, but Bay Fiord was clear and they sailed its 45 miles in one day, reaching Thumb Mountain, at the west end of Sverdrup Pass, on the 13th. On 3 September they returned to Eureka and spent the rest of the month carrying out investigations from the station. They left for Resolute by R.C.A.F. aircraft on 29 September.

1957

On 11 April 1957 Thorsteinsson returned to Eureka with R. H. Janes. Two Eskimo and dog teams were again brought from Resolute. The R.C.A.F. aircraft which brought the party flew on and dropped supplies by parachute on the ice at Cape Stallworthy, in the north of Axel Heiberg Island, for use on the summer journeys. From 22 April to 9 May the party sledged across Fosheim Peninsula and round the entrance to Canyon Fiord. On 14 May they again left Eureka and crossed Nansen Sound to the entrance to Jugeborg Fiord, then east to reach Cape Stallworthy on the 23rd. They collected the supplies dropped in April, then travelled down the west coast of Axel Heiberg Island. At Cape Northwest, on 28 May, they turned west, crossed the Sverdrup Channel and arrived at the north-east of Meighen Island on the 30th. The party split here, Janes and one Eskimo returning to Li Fiord, Axel Heiberg Island, to hunt seal for dog food, while Thorsteinsson and the other Eskimo carried on west along the north and west coasts of Meighen Island. They crossed the island and went on to meet the rest of the party at Li Fiord on 6 June. They then returned north to Cape Stallworthy and spent three days at Cape Thomas Hubbard, further west. The return journey began on 17 June and meltwater on the ice made travelling difficult; Emma Fiord and Jugeborg Fiord were visited and Eureka reached on 5 July. During July and August the geology of the Fosheim Peninsula was studied on foot and later by canoe. The party left by air for Resolute on 23 September.

In a cairn on the south-west end of Meighen Island Thorsteinsson discovered a note written by H. K. E. Krueger, leader of the missing German arctic expedition. The note, dated 6 June 1930, said that the party was well and about to set out for Cape Sverre on Amund Ringnes Island. It had previously been thought that the men had died either on Meighen Island or on the west coast of Axel Heiberg Island.

RECONNAISSANCE GEOLOGICAL SURVEY OF NORTHERN FOXE BASIN, 1956 AND 1957

[Summarized from *Arctic Circular*, Vol. 9, No. 4, 1956, p. 55–57 and Vol. 10, No. 2, 1957, p. 24.]

R. J. Blackadar, Geological Survey of Canada, assisted by J. Pirrit, carried out geological survey work in the northern Foxe Basin from May to September 1956. They flew from Churchill to Hall Lake early in May, and travelled on to Igloolik by dog team on 7 May.

During the latter part of May, and in June, four Eskimo and their dog teams were hired and journeys made from Agu Bay in the west, part of the way up Gifford Fiord and to Jens Munk Island. Late in June the party travelled to the mouth of Ravn River accompanied by three Eskimo dog teams and carrying a 17 ft. canoe. The Eskimo then returned to Igloolik. From 4 July until 19 August Blackadar and Pirrit worked in the area north of Steensby Inlet, using a 3 h.p. outboard motor on the canoe. They were met by four Eskimo on the 19th, about 15 miles east of the mouth of Ravn River, and the party reached Igloolik on the 24th. Bouverie Islands and the Richards Bay area, north-west of Igloolik, were visited before Blackadar and Pirrit ended their field work on 11 September, and returned south on *Calanus* and by air.

In 1957 Blackadar returned to complete the survey. During May and June he made a 750-mile sledge journey accompanied by two Eskimo along Fury and Hecla Strait and north to the south end of Admiralty Inlet. During July he and an Eskimo Pacome Kalaut, with four pack dogs, visited the region south of Neergaard Lake. A 22 ft. freighter canoe was transported by sledge to Cape Thalbitzer early in July, and, following the break-up, the party sailed north-east to Steensby Inlet and then followed the west coast of Baffin Island as far south as Eqe Bay. They were met there on 30 August by an Eskimo trap boat and returned to Igloolik on 6 September. Survey work was continued west of Igloolik until 23 September and Blackadar left the region on 3 October.

UNITED STATES DRIFTING STATIONS IN THE ARCTIC OCEAN, 1957–58

[Summarized from information supplied by Rear-Admiral C. W. Thomas, U.S.N.]

The two United States drifting stations in the Arctic Ocean "Alpha" and "Bravo" were established during April, May and June 1957 and form part of the United States I.G.Y. Arctic Basin Program. They were established from the air by the United States Air Force which is responsible for their support and the provision of non-scientific personnel for their maintenance during the I.G.Y. "Alpha" was established on an ice floe in lat. 80° N., long. 159° W. "Bravo" is on the ice island "T-3",[1] or "Fletcher's Island", which was relocated in lat. 82° 50′ N., long. 99° W. Both stations are drifting at the rate of up to 10 miles (16 km.) a day, "Alpha" from north to south and "Bravo" towards the west. Their positions on 31 March 1958 were: "Alpha" lat. 83° 30′ N., long. 152° W., "Bravo" long. 80° N., lat. 119° 12′ W.

There are eleven scientists on "Alpha", scientific leader Norbert Untersteiner, and eight on "Bravo", scientific leader Robert LeBlanc; the United States Air Force provides about twenty support personnel. At each station the scientific staff is relieved every four months with alternating parties.

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[1] *Polar Record*, Vol. 6, No. 45, 1953, p. 684–87; Vol. 7, No. 50, 1955, p. 416–17.

The buildings on "Alpha" consist of twenty "Jamesway" huts; on "Bravo" they are mainly modified commercial trailers, with a few prefabricated huts and shelters.

Observations are being made in the following disciplines: "Alpha", aurora, geomagnetism, glaciology, gravity, meteorology, oceanography, seismology and marine biology; "Bravo", aurora, ionospherics, meteorology, oceanography and seismology.

The planning and direction of the Arctic Basin Program is under the Arctic Committee of the United States National Committee for the I.G.Y., chairman John C. Reed, and a special Arctic Basin Working Group.

SOVIET DRIFTING STATIONS IN THE ARCTIC OCEAN, 1957–58

[From *Vodnyy Transport* (*Water Transport*), 11 March 1958; Moscow Radio, 19 February 1958.]

During the year following the relief of SP-6, and the establishment of SP-7 in the spring of 1957,[1] there was little to report from the Soviet drifting stations beyond their routine scientific observations.

SP-6 continued to drift in a north-westerly direction and was relieved in April 1958 by S. T. Serpalov and a new group of winterers. The air expedition carrying out the relief of both stations was led by M. M. Nikitin.

SP-7, starting from lat. 82° 04′ N., long. 164° 50′ W., somewhat to the north of the point at which SP-2 concluded its drift in 1951, moved mainly northwards during the year, except for an unexpected period of southerly drift in the autumn of 1957. Relief was carried out in April 1958 by a party led by N. A. Belov, a submarine geologist. The scientific programme of the relief party included sea bottom sampling, for which a heavier coring device was taken, capable of obtaining cores of up to 8 m.

Each station has a staff of about fifteen men.

ARGENTINE ANTARCTIC EXPEDITION, 1956–57

[The following notes have been prepared from press and radio reports by Ena Thomas. The last report on Argentine Antarctic expeditions (1954–56) was given in the *Polar Record*, Vol. 8, No. 57, 1957, p. 522–25.]

In 1956–57 the Argentine Government sent its annual expedition to the Antarctic, under the command of Capitán de Navío Helvio N. A. Guozden.

Eight ships took part in the operations. They were the icebreaker *General San Martín*, Capitán de Navío Jorge A. Boffi; the transports *Bahía Aguirre*, Capitán de Fragata José C. T. Carbone, *Bahía Thetis* and *Les Eclaireurs*, Capitán de Corbeta Enrique I. Paquien; the tankers *Punta Ninfas* and *Punta Loyola*; and the ocean-going tugs *Chiriguano*, Capitán de Corbeta Angel L. Bernasconi, and *Sanavirón*, Capitán de Corbeta Eduardo H. Fraga. Air support consisted of two Catalina flying boats, two Sikorsky S-55 helicopters and a Beaver aircraft under the command of Capitán de Corbeta C. W. Walsh. The Catalinas operated from Deception Island.

The first ships left Buenos Aires on 26 November 1956, and did not finally return until mid-March 1957. Their main task was the relief of the occupied stations on Laurie Island in the South Orkney Islands, Half Moon Island and Deception Island in the South Shetland Islands, Hope Bay on Trinity Peninsula, Gamma Island in the Palmer Archipelago, Paradise Harbour and Barry Island on the west coast of Graham Land, and the Filchner Ice Shelf station, "Base General Belgrano". The naval detachment was withdrawn from Hope Bay in December 1956; the Army detachment continued to occupy the station. In preparation for the International Geophysical Year, additional equipment was installed and radio communications at all the stations were improved.

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[1] *Polar Record*, Vol. 8, No. 57, 1957, p. 519–21.

A number of refuge huts were occupied for the summer season. These were at Thule Island in the South Sandwich Islands, Potter Cove and Ardley Peninsula on King George Island in the South Shetland Islands, Dorian Bay in the Palmer Archipelago, Orne Harbour on the Danco Coast and Watkins Island in the Biscoe Islands. A new refuge hut was established on Rabot Island in the Biscoe Islands. The Brialmont Cove refuge hut was also occupied by a summer party doing biological work, and a geological party spent several weeks working in the Ezcurra Inlet area of King George Island. It had been intended to occupy Thule Island on a permanent basis during the I.G.Y., but the volcanic activity on nearby Bristol Island, which had led to the hurried evacuation of the 1955 party, caused this plan to be dropped.

In December 1956 Contra-Almirante Rojas, Provisional President of Argentina and Chief of Naval Operations, visited Argentine stations in the South Shetland Islands and northern Graham Land, including Deception Island, Hope Bay, Gamma Island and Paradise Harbour. He travelled in the transport *Bahía Thetis.*

In February–March 1957 the British Naval Attaché in Buenos Aires, Captain Brian Gallie, R.N., and the United States Assistant Naval Attaché, visited five of the Argentine stations in the transport *Bahía Aguirre* as observers. Lieutenant B. C. Bishop, a member of the United States Antarctic Programs, spent some time as an observer on the *General San Martín.*

During the summer season, existing light and navigation beacons were serviced by the *Sanavirón.*

From 1 July 1957 all the occupied Argentine stations took part in the I.G.Y. scientific programme.

In October 1957 a new refuge hut was established on Rocca Reef in northern Marguerite Bay by a tractor party from the Barry Island station. It was occupied until relieved by ship during the summer of 1957–58.

CHILEAN ANTARCTIC EXPEDITION, 1956–57

[The following notes have been prepared by Ena Thomas. The information has been extracted from press and radio reports, and from an article in *Revista Geográfica de Chile,* "*Terra Australis*", No. 14, 1956–57, p. 33–48. The last report on Chilean activities (1955–56) was given in the *Polar Record,* Vol. 8, No. 57, 1957, p. 525.]

In October 1956 the Chilean Government despatched their eleventh expedition to the Antarctic. This expedition, which was under the command of Capitán de Navío Alejandro Navarrete Torres, had as its main objective the relief of the existing stations at Discovery Bay on Greenwich Island and at Pendulum Cove on Deception Island, both in the South Shetland Islands, at Cape Legoupil on Trinity Peninsula, and in Paradise Harbour on the Danco Coast of Graham Land. It was also to complete preparations at these four stations for the start of the International Geophysical Year in July 1957.

The ships taking part were the frigate *Baquedano,* Capitán de Fragata Jorge Paredes W.; the transports *Rancagua,* Capitán de Fragata Eduardo Beeche R., and *Angamos,* Capitán de Fragata Jorge Roman; and the patrol boats, *Lientur,* Capitán de Corbeta Jorge Thornton S., and *Lautaro.* A beaver aircraft and two helicopters were carried south by the ships.

The civilian scientists who accompanied the expedition for the summer season were a glaciological group consisting of Profesór Humberto Barrera V., Profesór

Emilio Vicens Rivera, Profesór Sergio Alvarado M., Profesór Oscar González Ferrán and Profesór Erik Klohm H.; a marine biological group consisting of José Valencia Díaz, Gastón Bejarano Barriga and Oscar Miranda Brand; with Dr Tito Figari G. to study aurora and airglow.

The first ships left Valparaiso on 25 October 1956, carrying relief personnel and stores for the Discovery Bay and Deception Island stations. They called at Punta Arenas early in November and reached the South Shetland Islands about the middle of the month. They at once began the work of relieving these two stations. The members of the naval party chosen to occupy the Discovery Bay station during 1957 were:

Capitán de Corbeta Edgardo T. Apel, Officer-in-charge
Teniente 2° Julio Vergara
Sargento 1° Víctor M. Medel Acuña
Sargento 1° Pablo Soto Bórquez
Sargento 2° Hernán Reyotel Zúñiga
Sargento 2° Raúl Rodríguez
Cabo Ricardo Forrich
Cabo Narciso García
Marinero Jorge Cruces

The 1957 wintering party for the Deception Island station were:

Teniente Sergio Lizasoaín Mitrano, Officer-in-charge
Subteniente Mario Jiménez Vargas
Sargento 2° Teodoro Montini Ulloa
Sargento 2° Cornelio Luna Madrigal
Sargento 2° Gustavo Romero Martínez
Sargento 2° Oscar Espinoza Soto
Cabo Pedro Abarca Urra
Soldado Héctor R. Díaz Peña

The *Rancagua* took the 1956 wintering parties to Punta Arenas early in December and then sailed south again with the *Baquedano*, carrying the relief parties and stores for the Cape Legoupil and Paradise Harbour stations. The members of the Army detachment chosen to winter at Cape Legoupil in 1957 were:

Capitán Luis A. Ovando Palet, Officer-in-charge
Teniente Oscar Inostroza Contreras
Subteniente Benjamín Videla Cifuentes
Dr Rafael Urzúa Ahumada
Vice Sargento 1° Pedro Hinojosa Navarrete
Sargento 2° Alberto Arancibia
Sargento 2° Eleuterio Avendaño
Cabo Juan Reyes

The 1957 wintering party for the Paradise Harbour station were:

Teniente Vicente Rodríguez Bustos, Officer-in-charge
Subteniente Jaime Lavín Fariña
Suboficial Leopoldo Valenzuela Osses
Sargento 2° Gabriel Valencia Vargas
Sargento 2° Juan G. Valenzuela Vidal
Sargento 2° Jorge R. Avalos Avalos
Cabo Arturo Schampke Alay
Soldado Julio Concha Acosta

On 22 December 1956 a four-engined Douglas DC 6 B of the Chilean National Airline (LAN) made a non-stop tourist flight from Chabunco near Punta Arenas over the Chilean Antarctic stations. The passengers for this first tourist flight across Drake Passage included the Minister of Land and Colonization.

In mid-January 1957 the *Angamos* sailed from Valparaiso carrying the scientists who were to be in charge of observations for the I.G.Y. An extension was built at the Cape Legoupil station in order to house these scientists. It was named "Base Luis Risopatrón". The 1957 wintering party were:

Glaciology

Mayor Luis Correa Zendrin, also Officer-in-charge of the scientific station
Capitán Gustavo Valenzuela Pérez
S. O. May. Enrique Araya Osses

Exploration

Teniente Tomás Harris D.
Teniente Gustavo Paredes S.
Teniente Alvaro Urquieta C.

Aurora and airglow

Savá Svefanovic
Armín Lauterbach
Andrés Aceto
Eugenio Ossa R.
Allan Hardy V.
Luis Carrasco A.

Communications

Capitán Jorge Araos Muñoz
Sargento Mario Valdemar Cornejo

Meteorology and geomagnetism

Friedrich Schantz Z.

Auxilliary services

Vicesargento 1º Luis Salazar Oyarce
Sargento Florial Madrid Videla
Cabo Luis Maturana
Cabo Osvaldo Tapia

Four men also wintered at the Paradise Harbour station in 1957 in order to study aurora and airglow. They were: Carlos Boetsch F., Joaquín Tredinick, Pedro Vergara and Carlos Botti.

The *Rancagua* returned to Punta Arenas on 26 February 1957; and all the remaining ships were home by mid-March.

From 1 July 1957, all four Chilean occupied stations took part in the I.G.Y. scientific programme.

THE FALKLAND ISLANDS DEPENDENCIES SURVEY, 1956–57

[Summarized from information provided by the Colonial Office. An account of the Falkland Islands Dependencies Survey (F.I.D.S.) activities in 1955–56 was published in the *Polar Record*, Vol. 8, No. 57, 1957, p. 526–31. The concurrent activities of the Falkland Islands and Dependencies Aerial Survey Expedition (an integral part of F.I.D.S.) during the 1956–57 summer season were described in the *Polar Record*, Vol. 9, No. 58, 1958, p. 28–31.]

During the winter of 1956 ten British stations were occupied by F.I.D.S. parties: Signy Island in the South Orkney Islands; Whalers Bay, Deception Island, and Admiralty Bay, King George Island—both in the South Shetland Islands; Hope Bay, Trinity Peninsula; Port Lockroy, Wiencke Island, and Arthur Harbour, Anvers Island—both in the Palmer Archipelago; Danco Island, Argentine Islands, Detaille Island and Horseshoe Island—the last four off west Graham Land.

Relief of F.I.D.S. stations, 1956–57

The R.R.S. *Shackleton*, Captain N. R. Brown, left Southampton on 1 October 1956, carrying relief parties, stores and equipment. At Montevideo J. C. Brooks, First Secretary at the American Embassy there, joined the ship as United States observer. The *Shackleton* arrived at Port Stanley, Falkland Islands, on 1 November and left on her first southern voyage on the 14th. She first called at South Georgia and then relieved the Signy Island station on the 21st, putting a survey and geological party ashore at the eastern end of Coronation Island. After a brief return visit to South Georgia due to the illness of one of the crew, she relieved the stations at Admiralty Bay, Hope Bay, Danco Island, Port Lockroy, Arthur Harbour and Deception Island. Between 10 and 16 December hydrographic surveys were carried out in the Gerlache Strait and Neumayer Channel areas. The ship returned to Port Stanley on 21 December.

Meanwhile, the R.R.S. *John Biscoe*,[1] Captain W. Johnston, left Southampton on

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[1] *Polar Record*, Vol. 8, No. 55, 1957, p. 374.

26 November and reached Port Stanley on 22 December. She left on her first southern voyage on the 26th to meet H.M. Yacht *Britannia* and to take the Duke of Edinburgh on a tour of the F.I.D.S. stations.[1] At the same time she delivered mail and exchanged personnel. She returned to Port Stanley on 5 January 1957.

The *John Biscoe* left on her second southern voyage on 16 January with J. C. Brooks on board. She reached Admiralty Bay on the 19th, and then visited Hope Bay, View Point and Deception Island, where an Argentine observer, Teniente de Corbeta Dario J. Goñi, joined the ship. After visiting the Port Lockroy and Argentine Islands stations, a search was made for a new hut site on the Graham Coast. Prospect Point, close south of Ferin Head, was finally chosen. Stores were landed on 2 February and help given with the establishment of the new station. The Detaille Island and Horseshoe Island stations were relieved on 7 and 9 February, respectively, and then work was continued at Prospect Point. On 17 February *John Biscoe* again visited Detaille Island, and help was given with the establishment of a new refuge hut on the Loubet Coast close east of Andresen Island. Between 3 and 10 March Horseshoe Island was again visited, and a new refuge hut was built on the north-west coast of Blaiklock Island in northern Marguerite Bay. Final calls were made at Detaille Island, the Argentine Islands, Arthur Harbour and Port Lockroy between 16 and 23 March. On 24 March a wintering party from the Danco Island station was installed at the Cape Reclus refuge hut. Admiralty Bay was visited on 28 and 29 March, Hope Bay on 29th and Signy Island between 31 March and 2 April. The ship finally reached Port Stanley via South Georgia on 9 April. She sailed for England on 3 May, calling at South Georgia and Tristan da Cunha and reached Southampton on 4 June.

The *Shackleton* also left on her second southern voyage on 16 January with a cargo of live sheep, beef and mail for the South Georgia whaling stations, and personnel, stores and mail for the F.I.D.S. stations. She visited South Georgia first and reached Signy Island on 27 January, having collected the survey and geological party from Gibbon Bay, Coronation Island. Between 28 and 30 January Washington Strait was sounded, landings for survey and geological purposes were made by F.I.D.S. parties on Fredriksen Island and in Palmer Bay, Coronation Island, the Cape Geddes hut on Laurie Island (built in January 1946) was visited, and a survey party was put ashore on Moe Island. Admiralty Bay was visited on 2 February and a survey party from this station consisting of G. J. Davey, G. Monk, H. M. Noble and A. Precious was put ashore in Edgell Bay on Nelson Island. The ship then proceeded to Deception Island. Danco Island, Arthur Harbour and the Argentine Islands stations were visited between 16 and 26 February and ten days were spent at Prospect Point helping with the establishment of the new station, and charting the anchorage and approaches. Here the Argentine observer was transferred from *John Biscoe*. He remained aboard until 1 March when the *Shackleton* visited the Argentine station in Paradise Harbour. Between 28 February and 7 March final calls were made at the Argentine Islands, Arthur Harbour, Port Lockroy, Danco Island and Deception Island. On 8 March the Nelson Island survey party was returned to Admiralty Bay. Between 9 and 16 March Hope Bay and View Point were visited and a sledge party transported to Pitt Point in Crown Prince Gustav Channel. Admiralty Bay was again visited between 16 and 19 March and Visca Anchorage was charted. The ship returned to Port Stanley on the 23rd, finally reaching Southampton on 5 June.

Visit of British naval guardship, 1956–57

H.M.S. *Protector*, Captain J. V. Wilkinson, R.N., left Portsmouth on 5 October 1956 and reached Port Stanley, Falkland Islands, early in November. She left at once on her first southern voyage for the Hanusse Bay area, and on 10 November collected two members of F.I.D.S. from Roux Island by helicopter and returned them to Detaille Island.[1] *Protector* then returned to Port Stanley.

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[1] *Polar Record*, Vol. 8, No. 56, 1957, p. 457–58.

She left on her second southern voyage on 28 November for Grytviken in South Georgia, where a Royal Marine detachment was landed for cold weather training and to assist the Magistrate to maintain order on board the vessel *Harpon*, who's crew had been caught smuggling liquor. Meanwhile *Protector* visited the South Sandwich Islands, making the first helicopter landing on Vindication Island and photographing some of the other islands from the air. Between 4 and 7 December she made an ice reconnaissance in the Weddell Sea, returning to Leith Harbour on the 11th. Having re-embarked the Royal Marine detachment, she sailed again on the 14th, reaching Port Stanley on the 17th.

In January 1957 *Protector* escorted H.M. Yacht *Britannia* throughout the Duke of Edinburgh's tour of the Falkland Islands Dependencies.

During *Protector's* fourth southern voyage in February she visited the F.I.D.S. stations at Port Lockroy, where the United States observer joined the ship, and the stations at Admiralty Bay and Deception Island.

On her fifth southern voyage in March *Protector* visited Hope Bay, Admiralty Bay and Deception Island. She then went to the Faure Islets in Marguerite Bay to collect F.I.D.S. personnel from *John Biscoe*. Finally, she called at Signy Island and returned to Port Stanley on 21 March.

Protector left again on 25 March, visited South Georgia, finally reaching Portsmouth on 15 May.

During the summer season an Admiralty Hydrographic survey unit, led by Lieutenant C. J. C. Wynne-Edwards, R.N., charted the whole of the Bismarck Strait area.

Activities at F.I.D.S. stations, 1957

Routine meteorological observations were continued throughout the year at the occupied stations at Signy Island, Deception Island, Admiralty Bay, Hope Bay, Argentine Islands, Detaille Island and Horseshoe Island. Radio-sonde observations were also made at the Argentine Islands and ionospheric work was carried out at Port Lockroy. Routine weather forecasts were made from Grytviken. The forecast area was extended on 1 October 1956 to cover the pelagic whaling area. Forecasts were increased to two a day in late November until the end of the whaling season.

A number of survey and geological journeys were made on Coronation Island by members of the Signy Island station. Between 21 November 1956 and 27 January 1957 a party consisting of J. F. D. Bridger, A. B. Hall, D. H. Matthews and R. L. Sherman worked inland from Gibbon Bay, and later in the year several small parties visited the Shingle Cove area to make further observations for the triangulation. The survey of the whole of Coronation Island was completed by September 1957. Meanwhile the geological survey of Signy Island, begun in 1956, was continued and some glaciological work was carried out.

Glaciological work and survey were also continued on King George Island by members of the Admiralty Bay station.

A number of sledge journeys were made from Hope Bay. On 13 March 1957 L. Rice, H. W. Simpson, R. W. Tufft, and R. I. Walcott were landed at Pitt Point in Crown Prince Gustav Channel from *Shackleton*. During the next two months they reconnoitred the route inland and laid a depot near the northern end of Detroit Plateau, returning to the View Point refuge hut on 29 May. Between 11 August and 14 September Rice and W. W. Herbert surveyed the East Russell Glacier area. On 8 October Rice, D. K. Brown, Herbert and P. B. Thompson left Hope Bay for Detroit Plateau with a view to travelling southwards to the Cape Reclus refuge hut. This journey was successful and they were met by a party from Cape Reclus on 26 November, reaching the refuge itself on 1 December.

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[1] See *Polar Record*, Vol. 8, No. 57, 1957, p. 530.

The View Point hut was occupied continuously by members of the Hope Bay station.

Some interesting journeys were also made from the Danco Island station and from the Cape Reclus refuge hut. Between 8 January and 8 February M. B. Bayly, D. G. Evans, L. Harris, and A. L. Shewry crossed Detroit Plateau from Cape Reclus and made the first ascent of Mount Johnston, which is 7580 ft. (2310 m.) high. Towards the end of February a party from Danco Island carried out geological and survey work in Andvord Bay. On 24 March R. A. Forster, D. Kershaw and R. McGowan were taken by *John Biscoe* to the Cape Reclus hut for the winter. The other three members of the party, D. G. Evans, G. J. Hobbs and V. O'Neill, remained in occupation at the Danco Island station. During the winter this latter party made four journeys to the Paradise Harbour area for survey and geological work and to reconnoitre a route onto the plateau. They were away from the station between 21 April and 16 May, between 25 July and 28 September, during part of October, and again between 12 November and 1 December. In November the Cape Reclus party set out for Detroit Plateau, travelling northwards to meet the party from Hope Bay on 26 November. They all returned to Cape Reclus on 1 December and remained there until relieved by the *John Biscoe* on 28 December.

Survey, glaciology and geological work on Anvers Island were continued by members of the Arthur Harbour station. By the end of 1957 the survey of Anvers Island had been completed and the station prepared for evacuation.

The survey and geological programme at Prospect Point was initiated in April, with several short reconnaissance journeys. In August to October R. Curtis, B. Holmes, R. Miller and F. E. Wooden made geological observations and completed the triangulation between Prospect Point and Chavez Island. The first search for a route to the plateau was unsuccessful.

Survey and geological work were continued from the Detaille Island station between March and December 1957, with very few breaks. In May 1957 A. B. Erskine and J. S. Madell reached Avery Plateau in the vicinity of Castle Peak. At the same time D. C. Goldring and J. P. Smith laid depots along the route to Castle Peak and then returned to Detaille Island, making geological observations along their route. Erskine and Madell carried the survey southwards along the plateau, down the Finsterwalder and Forel Glaciers to Bourgeois Fjord and thence to the Horseshoe Island station which they reached on 16 June. They left again on the 23rd, accompanied by two members of that station, P. Gibbs and H. A. Imray. On the return journey, survey in the vicinity of Heim Glacier enabled the Horseshoe Island and Detaille Island triangulation schemes to be linked. All four men reached Detaille Island on 28 June. Gibbs and Imray left again on 2 July. Between July and September Lallemand Fjord was triangulated by the Detaille Island surveyors. In August geological work was carried out in the Hanusse Bay area. In September and October survey and geological work were done in Darbel Bay. The West Gould Glacier and the adjoining glacier system were surveyed. Castle Peak, which is 8260 ft. (2520 m.) high, was climbed. H. T. Wyatt continued work on dog physiology.

Three members of the Horseshoe Island station, Gibbs, N. A. Procter and J. M Rothera, were installed at the Blaiklock Island hut by *John Biscoe* on 8 March 1957, and survey and geological work was carried out in the surrounding areas until 16 June when Erskine and Madell arrived from the Detaille Island station and the whole party returned to Horseshoe Island. After their visit to Detaille Island Gibbs and Imray returned on 9 July to Blaiklock Island, where they were joined by J. W. Fellows, B. R. Roberts and Rothera. They continued to work on the survey of the area. Fellows, Roberts and Rothera returned to Horseshoe Island on 24 July; Gibbs and Imray on 21 August. Meanwhile, P. Guyver and Procter set out to do geological work on Adelaide Island. They were away from 9 July until 3 August, visiting the Blaiklock Island hut and camping on Day Island in Laubeuf Fjord, but the programme had to be curtailed because of bad weather. Between 5 and 14 August G. M. Larmour and Rothera continued the survey of Laubeuf Fjord. Between 2 September and 11 October Guyver and Procter worked on the geology of eastern Adelaide Island and visited the Dion Islets. Between 28 September and 27 October Gibbs, Imray, L. Maloney and Rothera returned to the Blaiklock Island hut and completed the year's survey triangulation programme in the mainland area north of Bigourdan Fjord and Jones Channel. The last journey of the season was made by Larmour and Procter between 21 November and 11 December to continue the geological work in Laubeuf Fjord.

All of the occupied stations except Danco Island, Arthur Harbour and Prospect Point contributed to the I.G.Y. scientific programme.

APPENDIX. *Wintering parties at F.I.D.S. stations*, 1957

Port Lockroy, Wiencke Island, Palmer Archipelago (*Base A*)

C. C. Clement, Officer-in-charge and diesel electric mechanic
G. A. Farquhar, Radio operator mechanic
L. J. Fox, General assistant (ionospheric)
P. R. Gale, General assistant
J. M. Smith, Scientific assistant (senior)
J. Tinbergen, Scientific assistant

Deception Island, South Shetland Islands (*Base B*)

J. Paisley, Officer-in-charge and meteorological assistant
R. D. Clements, Diesel electric mechanic
J. E. Dagless, Meteorological assistant
C. Johnson, Radio operator mechanic
P. O. White, Meteorological assistant
A. J. Witcombe, Meteorological assistant (senior duties)

Hope Bay, Trinity Peninsula (*Base D*)

L. Rice, Officer-in-charge and surveyor
S. C. B. Blake, Radio operator mechanic (senior duties)
D. K. Brown, Meteorological assistant
H. J. Dangerfield, Radio operator mechanic
W. W. Herbert, Assistant surveyor
C. Johnstone, Meteorological assistant (senior duties)
M. J. F. Reuby, Meteorological assistant
H. W. Simpson, Medical officer
P. B. Thompson, Meteorological assistant
R. W. Tufft, Meteorological assistant
R. I. Walcott, Meteorological assistant
J. S. Walsh, Diesel electric mechanic

Argentine Islands, Graham Coast (*Base F*)

D. Emerson, Officer-in-charge and medical officer
G. T. Cutland, General assistant (cook)
J. C. Farman, Scientific officer
E. R. Hughes, Senior meteorological assistant
G. R. Ibbotson, Meteorological assistant
J. M. Nantes, Meteorological assistant
W. A. G. Nicholls, General/meteorological assistant
M. J. Royle, Radio operator mechanic
G. C. Rumsey, Diesel electric mechanic
D. A. Simmons, Assistant experimental officer
R. L. Tapp, Meteorological assistant

Admiralty Bay, King George Island, South Shetland Islands (*Base G*)

A. Precious, Officer-in-charge and meteorological assistant
P. J. Bunch, Radio operator mechanic (senior duties)
G. J. Davey, Assistant surveyor
R. H. Hillson, Meteorological assistant
G. Monk, Radio operator mechanic
H. M. Noble, Assistant glaciologist
D. R. K. Stephens, Meteorological assistant
A. J. Wensley-Walker, Diesel electric mechanic

Signy Island, South Orkney Islands (*Base H*)

C. D. Scotland, Officer-in-charge and meteorological assistant
S. E. Black, Meteorological assistant
J. F. D. Bridger, Assistant surveyor
A. K. Donnelly, Radio operator mechanic
D. W. McDowell, Meteorological assistant (senior duties)
R. L. Sherman, Assistant surveyor
D. Skilling, Diesel electric mechanic
D. Statham, Meteorological assistant

Prospect Point, Graham Coast (*Base J*)

R. Miller, Officer-in-charge, general assistant and handyman
D. Chalmers, General assistant
R. Curtis, Geologist
B. Holmes, Surveyor
A. R. Rumbelow, Radio operator mechanic
F. E. Wooden, Assistant surveyor

Arthur Harbour, Anvers Island, Palmer Archipelago (*Base N*)

J. W. Thompson, Officer-in-charge, general assistant and mountaineer
B. L. H. Foote, Radio operator mechanic
J. Ketley, Assistant surveyor
G. K. McLeod, General assistant and mountaineer
J. P. Wylie, Assistant surveyor

Danco Island, Danco Coast (*Base O*)

R. A. Foster, Officer-in-charge, general assistant and handyman
D. G. Evans, Assistant surveyor
G. J. Hobbs, Geologist
D. Kershaw, Assistant surveyor (senior)
R. McGowan, General assistant and radio operator
V. O'Neill, Radio operator mechanic

Detaille Island, Loubet Coast (*Base W*)

A. B. Erskine, Officer-in-charge and surveyor
O. S. Connochie, Radio operator mechanic
D. C. Goldring, Geologist
W. McDowell, Meteorological assistant (senior duties)
J. S. Madell, Assistant surveyor
F. Oliver, Diesel electric mechanic
J. M. Scarffe, Meteorological assistant and mountaineer
J. P. Smith, Meteorological assistant
J. Thorne, Meteorological assistant
H. T. Wyatt, Medical officer

Horseshoe Island, Fallières Coast (*Base Y*)

P. Guyver, Officer-in-charge and diesel electric mechanic
J. W. Fellows, Meteorological assistant
P. Gibbs, Assistant surveyor
H. A. Imray, Medical officer
G. M. Larmour, Meteorological assistant
L. Maloney, Meteorological assistant (senior duties)
N. A. Procter, Geologist
B. R. Roberts, Radio operator mechanic
J. M. Rothera, Assistant surveyor

Grytviken, South Georgia (Base M)

J. Ford, Officer-in-charge and meteorological assistant (senior duties)
J. Cochrane, Meteorological assistant
A. J. Freer, Meteorological assistant
M. Smith, Meteorological assistant

OCEANOGRAPHICAL CRUISE OF H.M.N.Z.S. *HAWEA* AND *PUKAKI* IN THE SOUTHERN OCEAN, 1956–57

[Summarized from information provided by the New Zealand Department of Scientific and Industrial Research.]

During the Antarctic season of 1956–57 the New Zealand naval frigates *Hawea*, Lieut. Commander W. J. Brown, and *Pukaki*, Lieut. Commander R. T. Hale, carried out oceanographical work in the Ross Dependency area of the Southern Ocean. One member of the staff of the New Zealand Oceanographic Institute sailed on *Hawea* and three on *Pukaki*.

The frigates, escorting H.M.N.Z.S. *Endeavour*, left Dunedin on 19 December 1957 and reached a point about 30 miles inside the loose pack ice, at lat. 67° 30′ S., long. 179° 58′ E., on the 27th. There they parted from *Endeavour* and stood off Scott Island where unsuccessful attempts to land were made. The frigates then sailed together to lat. 64° 54′ S., long. 178° 10′ E., where they parted and returned separately to New Zealand, each carrying out oceanographical work. Throughout the cruise surface water samples for salinity analysis were collected at hourly intervals, and surface temperature was recorded on continuously recording thermographs; water samples were taken for ^{14}C analysis from a depth of about 2600 m. at a number of stations.

AUSTRALIAN NATIONAL ANTARCTIC RESEARCH EXPEDITION, 1957–58

[By P. G. Law. Previous accounts of the expeditions were in the *Polar Record*, Vol. 5, No. 37/38, 1949, p. 317–23; Vol. 6, No. 41, 1951, p. 80–84; No. 45, 1953, p. 667–69; Vol. 7, No. 50, 1955, p. 400–2; No. 51, 1955, p. 497–98; Vol. 8, No. 54, 1956, p. 258–59; and No. 57, 1957, p. 533–34.]

Mawson, 1957

During 1957 Mawson station was manned by a party of twenty-five men led by Keith Mather. With the commencement of the I.G.Y., the scope of scientific work was widened considerably. A neutron monitor was set up and equipment for measuring ionospheric winds by tracking meteors by radar was introduced; an ionospheric recorder was assembled and began soundings in December; the magnetic observatory was extended by provision of a flux meter for recording rapid fluctuations in the terrestrial field; and gravity measurements–both along the coast east and west (totalling about 900 miles) and about 400 miles (645 km.) south of Mawson—were continued.

Glaciological research included detailed studies of surface and borehole temperatures, stratification and the factors affecting the mass economy of the ice sheet. An investigation of the Amery Ice Shelf–Sandefjord Bay region was made and the limits of the Prince Charles Mountains and the Lambert Glacier were closely defined by air survey.

Biological research was continued, with special emphasis on Emperor Penguin studies. Three new Emperor Penguin rookeries were discovered, one of them (about 35 miles east of Mawson) comprising 24,000 birds.

In September a subsidiary auroral and meteorological station was established at Taylor Glacier, about 60 miles (105 km.) west of Mawson.

Air survey and mapping proceeded in the Prince Charles Mountains and Amundsen Bay localities, and more astrofixes were secured in these areas and on the coast of Enderby Land. During the year the aircraft flew approximately 80,000 miles in the course of survey work, depot-laying and general assistance to ground parties.

A seismic trip into the interior was undertaken from Mawson between 9 November 1957 and 16 February 1958. The party comprised: K. B. Mather, leader; M. J. Goodspeed, seismologist; N. J. Collins, engineer; R. L. Willing, medical officer; B. E. Shaw, radio operator; and M. M. Mellor, navigator and glaciologist. The party measured ice thickness and the contours of the underlying rock surface along a 400-mile (645 km.) traverse approximately due south from Mawson. Most of the run was along meridian 62° E. The furthest point south at which seismic measurements were made was lat. 72° 52′ S.

The transport comprised two Caterpillar D4 tractors, each pulling five sledges, and one Weasel for scouting and navigation. A new route south of Mawson was found by initial air survey followed by Weasel reconnaissance. This proved safe for heavy tractor trains over all but a mile or so of its length. No serious crevassing was encountered. The party travelled about 900 miles and was in the field for 100 days.

Subsidiary scientific work carried out during the trip included: gravity determinations every five miles to supplement the seismic shooting at 20-mile (30 km.) intervals; measurement of magnetic declination; general glaciological observations of snow surface, temperatures in boreholes to 100 ft. (30 m.) and examination of stratification in pits; meteorological observations; synoptic (6-hourly) observations with daily pilot balloons whenever visibility permitted.

The preliminary results of the trip indicate that the plateau rises to an altitude of about 9500 ft. (2900 m.) at 200 miles (320 km.) inland, but thereafter does not alter. The maximum ice thickness recorded was 8500 ft. (2700 m.) in lat. 70° 31′ S., long. 62° 09′ E., but it varied considerably along the traverse. The underlying surface was found to be mountainous in most places, but occasionally the surface fell below sea-level. Magnetic declination changed from long. 59° W. at the coast to long. 63·5° W. at a point 400 miles (645 km.) inland. The sastrugi indicated that wind strength increased for the first 200 miles (320 km.) but decreased further inland; the maximum height of sastrugi encountered was about 4 ft. 6 in. (1·5 m.). The direction of the wind as shown by the sastrugi swung to the west as the distance from the coast increased. At lat. 73° S. its bearing was about 227°. The minimum temperatures recorded in February were about −30° F. (−40° C.), but in general the average temperatures during the trip ranged from −10° to +10° F. (−23° to −12° C.). The chief weather delays were due to whiteout (almost one day in three) and snow drift (two days in three).

Davis, 1957

The pioneer Davis party comprised five men, leader Robert Dingle.

Continuous meteorological and auroral observations were maintained at Davis during 1957. A geological survey was made in the Vestfold Hills and Larsemann Hills, and a limited biological programme was carried out along the coastline of Vestfold Hills between Tryne Sound and the Sorsdal Glacier.

A team of six dogs was used for exploration in the Vestfold Hills area, and the "Beaver" aircraft from Mawson was used to transport parties to the Larsemann Hills and the southern Sandefjord Bay area. Between April and December 1957 over 1200 miles of dog sledging was carried out.

Two unusual features of the Vestfold Hills area found were the existence of several large salt-water lakes which remained ice-free throughout the year, and the presence of large bull Elephant Seal concentrations near Davis and on the Mule group of islands.

ANARE relief voyage, 1958

The 1958 relief expedition to Antarctica, led by Phillip Law, left Melbourne on 3 January in M.V. *Thala Dan*, Captain K. Hindberg. Lewis Islet, a small island in Davis Bay, was reached on 11 January and a party was landed there to instal an automatic weather station. While this work was in progress the ship turned east to explore the coast of King George V land and Oates Land. Bad weather and heavy ice rendered this attempt unsuccessful; however, accurate soundings were obtained over an extensive bank, north of Cape Freshfield, and a call was made at the French base "Dumont d'Urville" in Terre Adélie.

The party on Lewis Islet was picked up on 23 January after successfully installing and testing the automatic equipment. The station is now transmitting weather reports four times daily to Macquarie Island and Davis. Heavy pack ice prevented *Thala Dan* from calling at the United States "Wilkes" station, but the Australian observer with the Americans, J. Donovan, was flown out to *Thala Dan* with the mail plane on 29 January. After a brief call at the Soviet Station "Mirnyy" the ship anchored at Davis on 4 February and changeover operations were completed in the next two days.

The 1958 wintering party at Davis is: M. J. Flutter, officer-in-charge and meteorologist; L. G. Gardner, diesel mechanic; E. A. Trigwell, radio supervisor; and P. B. Turner, radio officer.

On 7 February the expedition sailed down Prydz Bay to the Larsemann Hills. Several landings were made on the mainland and offlying islands, and geological, magnetic and gravity observations were carried out in the next two days.

Mawson was reached on 10 February and, while changeover operations began, the ship sailed west to explore the coast of Enderby Land. Landings were made in Amundsen Bay on 13 February and an astrofix was obtained.

The 1958 wintering party at Mawson is: I. L. Adams, officer-in-charge; R. R. Arnel, assistant geophysicist, seismic; J. Blair, diesel mechanic; J. R. Blake, physicist, aurora; A. Bolza, weather observer; R. A. Borland, meteorologist; D. A. Brown, radio officer; E. J. Burnett, radiophysicist; Dr J. E. G. Channon, medical officer; P. Chapman, physicist, aurora; B. G. Cook, geophysicist, magnetic; G. Downer, airframe fitter; D. Evans, diesel mechanic; F. A. Elliott, weather observer; H. J. L. Fischer, cook; I. Grove, pilot; E. Jesson, geophysicist, seismic; P. King, radio officer; G. A. Knuckey, surveyor; I. McLeod, geologist; O. Macguire, radio fitter; S. Manning, engine fitter; R. E. T. Oldfield, radio officer; R. Richardson, fitter; F. A. Smith, diesel mechanic; P. A. Trost, physicist, cosmic ray; H. Tschaffert, weather observer; D. R. Twigg, radio operator; W. Wilson, pilot.

The *Thala Dan* left Mawson on 2 March, calling in at Heard Island and Iles de Kerguelen en route to Melbourne.

Macquarie Island, 1957

Observatory work in geophysics was extended during 1957. A new 60 cm. cosmic ray telescope, an open-sights auroral theodolite, an ozone spectro-photometer and "whistler" recording equipment were installed and operated throughout the year. An extensive study of the local fauna was completed. A record number of Fur Seals was counted, and a record number of Elephant Seals branded. Many species of birds were ringed, including Giant Petrels and Rockhopper Penguins.

The Hurd Point auroral observatory at the southern extremity of the island was manned continuously for more than 11 months.

The relief of Macquarie Island took place between 11 and 23 December. A large hut with separate accommodation for fourteen men, together with toilet facilities, was built at the main station. A new hut, a 60-ft. (18 m.) steel tower and auroral radar equipment were landed at Hurd Point. During the changeover period a team of seven biologists carried out field work and made collections of the island fauna. They were R. A. Falla, R. Carrick, G. M. Dunnet, K. Keith, A. R. McEuly, M. D. Murray and W. H. Whitten.

The 1958 wintering party at Macquarie Island is: Major F. V. Baines, officer-in-charge; L. Brooks, weather observer; J. G. Cowling, physicist, aurora; J. D. Creed, radiophysicist; W. Harvey, carpenter; W/O G. E. Heinrichs, radio supervisor; L. Jennings-Fox, weather observer; I. Kaloczy, cook; H. Knox, radio officer; B. A. McInnes, physicist, cosmic ray; Dr R. Mayer, medical officer; H. Munstermann, weather observer; Cpl. W. D. Prenter, radio mechanic; A. Turpie, geophysicist; and Sergt. T. J. Webster, diesel mechanic.

INTERNATIONAL GEOPHYSICAL YEAR, 1957–58; ANTARCTICA, 1957–58

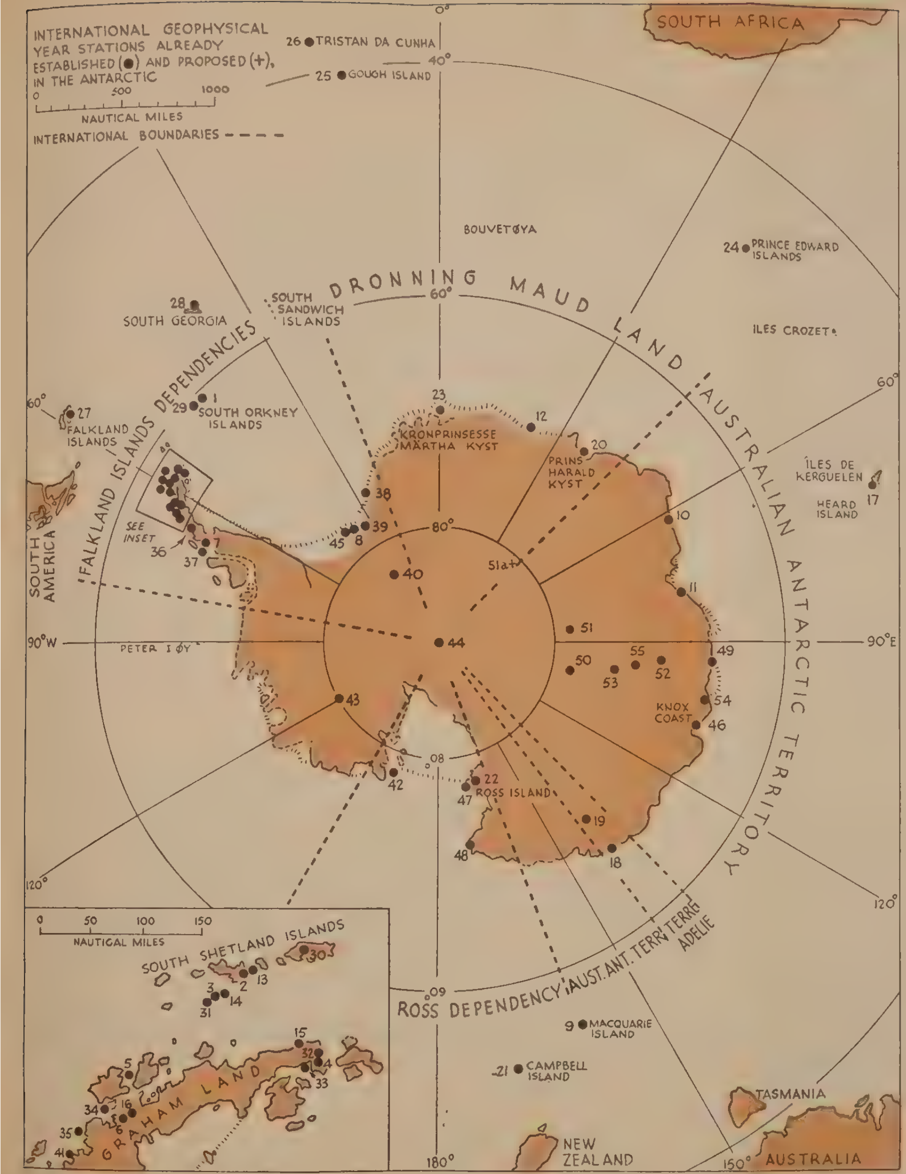
[Previous accounts of the nations operating in Antarctica during the International Geophysical Year were published in the *Polar Record*, Vol. 8, No. 53, 1956, p. 182–87; No. 55, 1957, p. 357–61; and No. 57, 1957, p. 535–41. The map on p. 258 is the final version of the one illustrating planned stations in the first of these notes. Details of Argentine, Australian, Chilean and U.K. (F.I.D.S.) activities are given elsewhere in this issue.]

Belgium

The Belgian I.G.Y. Antarctic Expedition left Anvers on November 1957 in *Polarhav*, Captain Sigmund Böe, and *Polarsirkel*, Captain John Jakobsen. Members of the party were: G. de Gerlache de Gomery, leader and pilot; X. de Maere d'Aertrycke, deputy-leader and meteorologist; L. Cabes, geomagnetician; R. Carels, photographer; J. Giot, kennel-man; T. van Gompel, medical officer; C. Hulshagen, mechanic; J. Hoogewys, radio officer; G. della Faille d'Huysse, quartermaster; Prince A. de Ligne, pilot and photographer; J. Loodts, surveyor; E. Picciotto, nuclear physicist and geologist; M. Vanderdoodt, meteorologist; H. Vanderheyden, aircraft mechanic; G. Vandepoel, meteorologist; H. Vandevelde, ionospheric physicist; M. van de Velde, mechanic.

The expedition was equipped with a Sabéna aircraft, a Bell 47 H.E. helicopter, two Sno-cats, a Muskeg and dogs.

The ships reached the pack ice on 20 December and had an easy passage to within sight of land in Breidvika, on Prinsesse Ragnhild Kyst. Reconnaissance flights were made on 23 and 26 December to search for a break in the high ice front at which the ships could be unloaded. On the 26th the helicopter crashed on land soon after de Gerlache and Prince de Ligne had discovered a suitable site. Neither were injured and they signalled the ships in to shore. Unloading was carried out without loss although, on 31 December, the fast ice broke up and began to move out, threatening the supply depot at the edge of the fast ice. A site for the station was chosen about 17 km. (10 miles) inland, in lat. 70° 26′ S., long. 23° 19′ E., and named "Roi Baudouin". The bay in which the ships anchored was called "Baie Roi Leopold III". The station, consisting of three main buildings and ancillaries, was built by 10 January 1958 and scientific work began immediately.



INTERNATIONAL GEOPHYSICAL YEAR STATIONS IN ANTARCTICA AND THE SUB-ANTARCTIC ISLANDS

(Key to map opposite)

ARGENTINA

1 "Orcadas", Laurie Island, 60° 45′ S., 44° 43′ W.
2 "Teniente Camara", Half Moon Island, 62° 36′ S., 59° 57′ W.
3 "Decepción" or "Primero de Mayo", Deception Island, 62° 59′ S., 60° 42′ W.
4 "Esperanza", Hope Bay, 63° 24′ S., 56° 59′ W.
5 "Melchior", Gamma Island, 64° 20′ S., 62° 59′ W.
6 "Almirante Brown", Paradise Harbour, 64° 53′ S., 62° 52′ W.
7 "General San Martín", Barry Island, 68° 08′ S., 67° 07′ W.
8 "General Belgrano", Filchner Ice Shelf, 77° 59′ S., 38° 44′ W.

AUSTRALIA

9 Macquarie Island, 54° 30′ S., 158° 57′ E.
10 Mawson, Mac-Robertson Land, 67° 36′ S., 62° 53′ E.
11 Davis, Princess Elizabeth Land, 68° 35′ S., 77° 59′ E.

BELGIUM

12 "Roi Baudouin", Breidvika, Prinsesse Ragnhild Kyst, 70° 26′ S., 23° 19′ E.

CHILE

13 "Arturo Prat", Greenwich Island, 62° 29′ S., 59° 38′ W.
14 "Pedro Aguirre Cerda", Deception Island, 62° 56′ S., 60° 36′ W.
15 "General Bernardo O'Higgins", Cape Legoupil, 63° 19′ S., 57° 54′ W.
16 "Presidente Gabriel Gonzalez Videla", Paradise Harbour, 64° 49′ S., 62° 52′ W.

FRANCE

17 Port-aux-Français, Îles de Kerguelen, 49° 20′ S., 70° 14′ E.
18 "Dumont d'Urville", Pointe Géologie, Terre Adélie, 66° 40′ S., 140° 01′ E.
19 "Charcot", South Magnetic Pole area, Terre Adélie, 69° 30′ S., 140° E., approx.

JAPAN

20 "Syowa", Ongul, 69° 29′ S., 39° 35′ E. Evacuated February 1958.

NEW ZEALAND

21 Campbell Island, 52° 33′ S., 169° 09′ E.
22 "Scott", Ross Island, 77° 50′ S., 166° 44′ E.

NORWAY

23 "Norway station", Kronprinsesse Märtha Kyst, 70° 30′ S., 2° 32′ W.

SOUTH AFRICA

24 Marion Island, Prince Edward Islands, 46° 53′ S., 37° 52′ W.
25 Gough Island, 40° 19′ S., 9° 54′ W.
26 Tristan da Cunha, 37° 03′ S., 12° 18′ W.

UNITED KINGDOM

27 Stanley, 51° 42′ S., 57° 52′ W.
28 Grytviken, South Georgia, 54° 17′ S., 36° 30′ W.
29 Signy Island (Base H), South Orkney Islands, 60° 43′ S., 45° 36′ W.
30 Admiralty Bay (Base G), King George Island, 62° 05′ S., 58° 25′ W.
31 Deception Island (Base B), South Shetland Islands, 62° 59′ S., 60° 34′ W.
32 Hope Bay (Base D), Trinity Peninsula, 63° 24′ S., 56° 59′ W.
33 View Point, Duse Bay, 63° 32′ S., 57° 24′ W.
34 Port Lockroy (Base A), Palmer Archipelago, 64° 50′ S., 63° 31′ W.
35 Argentine Islands (Base F), off Graham Coast, 65° 15′ S., 64° 16′ W.
36 Detaille Island, Loubet Coast (Base W), 66° 52′ S., 66° 48′ W.
37 Horseshoe Island (Base Y), Marguerite Bay, 67° 49′ S., 67° 17′ W.
38 Halley Bay (Royal Society base), Caird Coast, 75° 31′ S., 26° 36′ W.
39 "Shackleton" (Trans-Antarctic Expedition base), Filchner Ice Shelf, 77° 57′ S., 37° 16′ W. Evacuated November 1957.
40 "South Ice" (Trans-Antarctic Expedition advance base), 81° 56′ S., 29° 30′ W. Evacuated December 1957.
41 Prospect Point (Base J), Graham Coast, 66° S., 65° 24′ W.

UNITED STATES

42 "Little America V", Kainan Bay, 78° 16′ S., 162° 28′ W.
43 "Byrd station", Marie Byrd Land, 80° S., 120° W., approx.
44 "Amundsen-Scott station", South Geographical Pole.
45 "Ellsworth station", Filchner Ice Shelf, 77° 43′ S., 41° 07′ W.
46 "Wilkes station", Vincennes Bay, 66° 15′ S., 110° 35′ E.
47 "Williams Air Operations Facility", Ross Island, 77° 51′ S., 166° 37′ E. (Operational support base)

UNITED STATES/NEW ZEALAND

48 "Hallett station", Cape Hallett, 72° 25′ S., 170° 55′ E.

U.S.S.R.

49 "Mirnyy", Queen Mary Land, 66° 37′ S., 93° E.
50 "Vostok", South Geomagnetic Pole area, Wilkes Land, 78° 27′ S., 106′ 52° E.
51 "Sovetskaya", area of so-called "Pole of Relative Inaccessibility", Enderby Land, 78° 24′ S., 87° 35′ E. Temporary location. Establishment at approx. 82° S., 55° E. planned for 1958–59, 51a.
52 "Pionerskaya", Queen Mary Land, 69° 44′ S., 95° 30′ E. (Operational support base)
53 "Komsomol'skaya", Princess Elizabeth Land, 74° S., 99° E., approx. (Operational support base)
54 "Oazis", Queen Mary Land, 66° 30′ S., 101° E., approx.
55 "Vostok-I", Queen Mary Land, 72° S., 97° E., approx. Evacuated November 1957.

Polarhav and *Polarsirkel* left on 11 January and next day became beset about 50 km. (30 miles) north of "Baie Roi Leopold III". They drifted north-east in the ice until 11 February when they broke free and continued their voyage.

France

The scientific programme at "Dumont d'Urville" was fully in operation by April and continued throughout the year. During the winter three short journeys by Weasel were made to test seismic equipment. At "Charcot" a breakdown of the wind generator interrupted radio contacts for some weeks, and it was not until October that it finally replaced the hand generator. On 23 October a party of four, led by B. Imbert, left "Dumont d'Urville" in two Weasels to carry out a series of seismic soundings. They reached "Charcot" on 27 November and carried on to a point about 160 km. (100 miles) south of the station, in lat. 70° 47′ S., long. 139° 12′ E. and at a height of 2513 m (8240 ft.). Twenty-six seismic stations were occupied and the average altitude of the underlying rock was discovered to vary between about 600 m. (1970 ft.) above and below sea-level, though much of it was below sea-level. The party arrived back at "Dumont d'Urville" on 30 January 1958 after a journey of 1870 km. On 5 November 1957 M. Grisoni led a party of four, with a Sno-cat and two Weasels, to resupply "Charcot". This operation was completed by 8 January 1958. The third French I.G.Y. expedition left Le Havre on *Norsel* on 31 October 1957 and reached "Dumont d'Urville" on 8 January 1958. It was led by G. Rouillon and consisted of twenty members for "Dumont d'Urville" and three for "Charcot", led by R. Garcia. A team of two pilots and two mechanics for the Bell 47 G 2 helicopter, led by C. Petitjean, came for the summer season's operations.

The three members of the new wintering party at "Charcot" were flown to a point about 35 km. (25 miles) inland on 6 January 1958, from which they were taken on to their station by two Weasels commanded by M. Grisoni. The party reached "Charcot" on the 28th and arrived back at "Dumont d'Urville" on 3 February with the men who had been relieved. On 27 January the helicopter, piloted by P. Berthe, crashed about 32 km. south of "Dumont d'Urville". Blizzard conditions hampered the search parties and prevented the rescue flight of a Soviet AN-2 aircraft from the *Ob*'. The wreck was found 45 hours after the crash, with the pilot only slightly injured.

Norsel left "Dumont d'Urville" on 7 February and arrived in Hobart, Tasmania on the 15th.

Japan

The Japanese relief expedition left Tokyo on 21 October in *Soya*. It was led by Professor Y. Nagata and consisted of a summer season party of thirty, and a wintering party of twenty, to be led by M. Murayama. *Soya* became beset on 9 January 1958 in lat. 67° 46′ S., long. 38° 53′ E. and drifted south-west. On the 31st U.S.S. *Burton Island* sailed to her rescue, but she broke free on 6 February in lat. 68° S., long 31° E. The two ships made slow progress through the pack ice towards Lützow–Holmbukta and on 8 February the Japanese "Beaver" aircraft was able to reach "Syowa" and evacuate the previous year's wintering party. Weather conditions grew worse and by 24 February it became apparent that it would not be possible to land a wintering party and supplies. The station was therefore abandoned and *Soya*, with a damaged rudder, sailed north.

New Zealand

The 1958 wintering party has been increased to nine scientists led by L. H. Martin; A. L. Burrows, I. M. Gibson, R. H. Henderson, G. G. Midwinter, R. M. Robb, M. J. H. Speary, D. C. Thompson and P. A. Yates. Burrows and Robb flew from New Zealand early in October to strengthen the "Scott Base" party when the members of the

Trans-Antarctic party had left. The remainder travelled in H.M.N.Z.S. *Endeavour*, leaving New Zealand on 14 December. An Italian naval scientist, Lieut. F. Faggioni, is to join the New Zealand party for 1958.

New Zealand/United States

The name of this station was changed from "Adare" to "Hallett" after Cape Hallett near which it was built. During the Antarctic summer a number of visiting scientists worked at the station. The relief of the station was carried out by U.S.S. *Arneb* and *Private John R. Towle* which unloaded 900 tons of supplies early in January 1958. The new wintering party consists of seven scientists, of whom the leader, K. J. Salmon, and two others are New Zealanders. There is a U.S. naval supporting party of eight.

Norway

The Norwegian station, "Norway Station" was established in lat. 70° 30′ S., long., 2° 32′ W. about 40 km. (27 miles) in from the ice front and 56 m. (184 ft.) above sea-level. Two huts, each 7·2 m. (25 ft.) square, house radio and meteorological departments, and the living quarters. Each member of the expedition has a separate quarter in a third large hut. Ancillary buildings provide accommodation for the work of the various disciplines, and a tubular steel construction, 26 m. (85 ft.) high, for meteorological work.

Meteorological observations began in March 1957 and magnetic observations in April, the first radio sonde balloon was released on 9 June and the first auroral photograph taken on 13 September. Regular radio communication was maintained throughout the winter with other International Geophysical Year stations in Antarctica and with Bergen Radio.

On 22 November S. Helle, B. Grytøya, L. Hochtin and T. Lunde set out to survey the mountain region eastwards from about long. 3° E. Two diesel tractors, six sledges and two dog teams were used. The party reached the mountains in about lat. 71° 50′ S., long. 3° 30′ E. on 15 January 1958 after having lost one tractor in a crevasse. A camp was set up from which survey journeys were made by dog sledge.

Norsk Polarinstitutt and the Royal Society jointly chartered *Tottan*, Captain Leif Jakobsen, as relief ship at the end of 1957. *Tottan* left Tønsberg on 11 November and Southampton on 16 November, reaching the Norwegian station on 25 December. On 29 December she continued her voyage to Halley Bay. Three members of the wintering party were relieved; they were: H. Sœther, medical officer, replaced by A. Vinter-Johansen; A. Hemmestad, mechanic, replaced by H. Bjerke; and P. Larsen, steward, replaced by S. Pettersen.

United Kingdom

The location of the Royal Society base at Halley Bay, close to the main auroral zone, has resulted in a successful season's work in this discipline. Some auroral activity was seen on all dark clear nights during 1957, and efforts were made to correlate visual displays with radio echo studies. The comprehensive programme of I.G.Y. observations has functioned well. An addition to the meteorological programme in 1958 is a study of the vertical distribution of ozone in the atmosphere by means of ozone sondes designed by Dr Brewer. The instruments were delivered when U.S.S. *Westwind* and *Wyandot* visited Halley Bay on 8 January 1958. During the year a number of short sledge journeys were made, mainly connected with the glaciological programme.

The supply ship *Tottan* was shared with Norsk Polarinstitutt and left the United Kingdom in November 1957. After unloading at the Norwegian station in Dronning Maud Land she reached Halley Bay on 31 December and left again on 8 January 1958.

The scientific staff at Halley Bay during 1958 are: J. MacDowall, leader; A. Blackie, J. M. C. Burton, B. G. Ellis, J. A. Smith, D. T. Tribble and D. G. Ward, meteorological and geomagnetic group; W. H. Bellchambers, D. L. M. Cansfield and L. W. Barclay, ionospheric group; P. M. Brenan and D. P. Harrison, radio astronomy group; G. M. Thomas, auroral group.

United States

"*Little America V.*" The 1957 wintering party consisted of twenty-four scientists, led by A. P. Crary, and a naval supporting party under Captain W. F. Dickey, U.S.A. The scientists were: J. A. Alvarez, Argentine observer, meteorologist; H. J. Bengaard, physicist (ionosphere); H. F. Bennett, physicist (seismology); W. W. Boyd, *Jr.*, glaciologist; R. L. Chappell, scientific assistant; W. J. Cromie, physicist (gravimetry); P. C. Delrymple, glaciologist; B. W. Harlin, meteorologist; G. L. Harter, meteorologist; H. Hoinkes, glaciologist; J. P. Krank, meteorologist; W. C. Lavris, meteorologist; B. J. Lieske, meteorologist; F. M. Milan, physiologist; W. B. Moreland, meteorologist; V. L. Rastorguev, Soviet observer, meteorologist; B. F. Remington, *Jr.*, meteorologist; P. A. Shoeck, physicist (aurora and airglow); W. C. Sutton, meteorologist; R. C. Taylor, meteorologist; R. L. Veits, physicist (geomagnetics) S. A. Wilson, meteorologist; and C. O. Wyman, physicist (ionospherics).

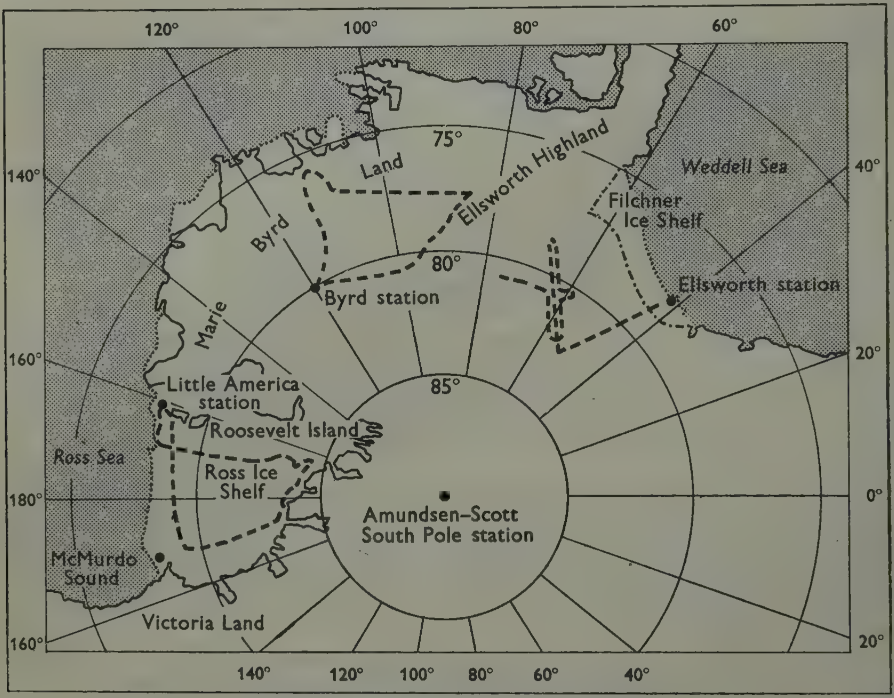
On 25 January a traverse party left the station and took seismic, glaciological and gravity observations on the route to "Byrd" station, where it arrived on 27 February. The main traverse party, of eight men led by A. P. Crary, left on 24 October 1957 to study the ice of the Ross Ice Shelf. It was equipped with three Sno-cats towing 2½-ton sledges and was resupplied by Naval aircraft at intervals of about ten days. The party returned to "Little America" on 13 February 1958 after a journey of 1450 miles (2330 km.), during which 34 seismic, 199 gravity and 160 magnetic stations were occupied (see map). A site for a temporary meteorological station, and an emergency landing ground for aircraft flying to the South Pole, was selected during flights by Naval R4D aircraft. It is at the foot of the Beardmore Glacier, about 312 miles (500 km.) from McMurdo Sound and 122 miles (190 km.) from the previous season's site at Liv Glacier.

Twenty visiting scientists worked at the station during the summer season. These included J. H. Zumberge, who carried out ice deformation studies in the area around Roosevelt Island. The 1958 wintering party of twenty-two scientists is led by A. P. Crary; the total wintering party numbers 107. The staff at Weather Central includes representatives from Argentina, A. J. Arruiz; Australia, K. Morley; France, M. Ault; and from U.S.S.R.

"*Byrd*" *station*. The 1957 wintering party of twelve scientists, led by G. R. Toney, were: V. H. Anderson, glaciologist; V. W. Barden, physicist (ionospherics); C. R. Bentley, physicist (seismology); L. E. Davis, physicist (geomagnetics); M. B. Giovinetto, glaciologist; D. P. Hale, physicist (aurora and airglow); N. F. Helfert, meteorologist; R. H. Johns, meteorologist; A. J. L. Morency, physicist (gravimetry); W. R. Morris, meteorologist; and N. A. Ostenso, physicist (seismology). There was a Naval support party of nine under Lieut. B. C. Dalton, U.S.N.

From 4 to 18 March the traverse party from "Little America V" carried out seismic refraction studies in the vicinity of "Byrd" station. On 24 October a tractor train, hauling 145 tons of supplies and equipment, arrived from "Little America V" to resupply the station. The "Byrd" traverse, led by V. Anderson, glaciologist, left the station on 19 November. It was equipped with three Sno-cats, towing 2½-ton sledges, and a wanigan, and was resupplied by air on four occasions. The object of the journey was to examine the ice sheet and mountains in east Marie Byrd Land and Ellsworth Highland. The party returned to the station on 20 February 1958 after a journey of 1026 miles (1650 km.) (see map). At this station SIPRE carried out a deep core drilling project during the summer season. Over 11 tons of equipment were flown from New Zealand and operations, directed by E. W. Marshall, began on 16 December 1957. The programme was completed on 26 January 1958 when a depth of 1013 ft. (310 m.) had been reached. At this level a temperature of −28·6° C. (−19·5° F.) was recorded. The complete 4 in. (10 cm.) core, in lengths of up to 19·5 ft. (6 m.), was despatched to the United States for detailed examination.

Thirteen visiting scientists worked here during the Antarctic summer. The wintering party consists of ten scientists led by S. S. Barnes, and a naval party. The 1958 supply train, which left "Little America V" on 20 January, was the largest yet seen in Antarctica. It consisted of seven 40-ton Caterpillar tractors towing twelve 20-ton sledges and three wanigans, one Sno-cat towing a 2½-ton sledge and a crevasse-detector Weasel.



United States traverse routes, 1957–58.

"*Amundsen–Scott*" *South Pole station.* The 1957 wintering party consisted of nine scientists led by P. A. Siple and a naval support party of eight under Lieut. J. Tuck, U.S.N. The scientists were: R. F. Benson, physicist (ionospherics and geomagnetics) and glaciologist; E. C. Flowers, meteorologist; J. F. Guerrero, meteorologist; H. L. Hansen, meteorologist; W. S. Hough, physicist (ionospherics); W. F. Johnson, meteorologist; A. U. Landolt, physicist (aurora and airglow); and E. W. Remington, glaciologist.

On 21 February the last of sixty-five flights carrying passengers, stores and equipment was made, and a month later all outside work on the buildings and installations was completed. During the winter a "snow mine" was dug from which supplies of snow were hauled for the station's water supply. Difficulties of mechanical transport in temperatures below −70° F. (−56° C.) made surface collection impracticable. The tunnel 7 ft. (2 m.) square descended at an 18° slope for over 200 ft. (60 m.) and was also used for glaciological observations. Comparison of auroral effects seen here with those seen at "Ellsworth" suggests that the auroral belt passed between the two stations. The first air-drop of the season took place on 17 October and the first aircraft landed on the 26th. Regular flights began in mid-November. The 1958 wintering party consists of ten scientists led by Palle Morgensen, and a naval supporting party of eight.

"*Wilkes*" *station.* The 1957 wintering party consisted of ten scientists led by C. R. Eklund and a naval support party of sixteen under Lieut. D. R. Burnett, U.S.N. The scientists were: R. J. Berkley, physicist (geomagnetics); R. L. Cameron, glaciologist; G. Dewart, physicist (seismology); R. Glasgal, physicist (aurora and airglow); R. A. Honkala, meteorologist; R. L. Long, physicist (ionospherics); O. Løken, glaciologist; J. R. L. Molholm, glaciologist, and G. H. Stonehocker, physicist (ionospherics and cosmic rays).

Early in March a substation was established about 50 miles south-west of "Wilkes" at an altitude of 4000 ft. (1220 m.). It was manned by two scientists throughout the winter for glaciological and meteorological observations. Regular journeys were made to relieve the substation and to carry out a glaciological programme on Vanderford Glacier. A Soviet cairn was discovered on Mitchell Island, left by a party that had stayed there from 18 October to 18 November 1956.

The station was relieved on 25 January 1958 by U.S.S. *Arneb*, *Atka* and *Burton Island*. During the unloading operations helicopter flights were made from *Atka* carrying geologists and a botanist to Haupt Nunatak. At the end of the month *Thala Dan* made an unsuccessful attempt to reach the station on the way to Mawson. The wintering party consists of eleven scientists, led by W. J. Tressler, and a naval supporting party.

"*Ellsworth*" *station.* The 1957 party consisted of ten scientists led by F. Ronne, a naval support party of thirteen and fifteen air personnel. The scientists were: N. B. Aughenbaugh, physicist (gravity); J. C. Behrendt, physicist (seismology); J. B. Brown, physicist (ionospherics); G. R. Fierle, meteorologist; J. McK. Malville, physicist (aurora and airglow); H. A. C. Neuburg, glaciologist; D. Skidmore, physicist (ionospherics); E. C. Thiel, physicist (seismology); and P. T. Walker, glaciologist.

Early in February Finn Ronne and H. A. C. Neuburg flew to "Shackleton" and in March, accompanied by E. T. Theil, they made reconnaissance flights as far as lat. 81° S., long. 38° W. in search of a suitable route for the traverse party later in the year. During these flights a new range of mountains was discovered. By 18 March all outside work on buildings and installations was completed and the scientific programme begun. In November two Air Force C47 aircraft flew to "Ellsworth" from Ushuaia, Argentina. The aircraft made a brief landing on Robert Island, South Shetland Islands, then weather conditions forced them down on Steele Island. The aircraft finally reached "Ellsworth" on 24 November. They returned along the same route in February 1958. The flight was commanded by Major J. W. Lassiter, U.S.A.F. who was a member of the Finn Ronne expedition in 1947–58. The traverse party, led by Theil, a glaciologist, left the station on 28 October 1957. It was equipped with two Sno-cats and set out to examine the Filchner Ice Shelf, and its hinterland, and to occupy a site that could be reached by a traverse party from "Byrd" station during the 1958 summer season (see map). After initial difficulties in heavily crevassed areas the party reached an elevation of 3140 ft. (960 m.) in lat. 81° 30′ S., long. 50° W. On 22 December they reached the mountain range discovered earlier in the year from the air. The mountains appeared to have an average height of 6500 ft. (1980 m.) and to extend for about 30 miles (45 km.) in an east-west direction along lat. 82° 33′ S. and between longs. 51° and 55° W. Black horizontal strata were observed high up on the mountains, and a 5000 ft. (1525 m.) escarpment was formed on the southern side. Reconnaissance flights sighted other mountains 125 miles (200 km.) south-west of "Ellsworth" between lats. 83° to 84° S. and longs. 60° to 70° W. A new ice rise (ice hill) in Filchner Ice Shelf was observed extending for about 230 miles (370 km.) south and west from Gould Bay and rising to 3140 ft. (960 m.) at lat. 80° S., long. 48° W. The rock floor was found to be several hundred feet above sea level. Other similar features were reported further to the west. The party travelled south towards "Mount Hassage" and on 2 February 1958 reached lat. 82° 04′ S., long. 54° 15′ W. They were flown back to "Ellsworth" from here and a relief party took the vehicles to a point midway between "Ellsworth" and "Byrd", where they were repaired and cached ready to be used during the next season. Visits were exchanged with the "General Belgrano" station and the *General San Martin* in February. The station was relieved by U.S.S. *Westwind* and *Wyandot* on 10 January. The new wintering party of fourteen scientists is led by M. J. Brennan; there are also eleven aircraft staff and a naval supporting party.

Naval Air Facility, McMurdo Sound. Commander W. F. Flynn was in charge of the naval support party of ninety-six in 1957. In March reconnaissance flights were made over the area around Cape Bernacchi in search of a permanent site for an air strip on land. The project included a two-week survey by seven men between Gneiss Point and Marble Point using an "Otter" aircraft and a helicopter. A blizzard on 13–18 June, with a wind rising to 84 knots, caused considerable damage to installations. Operational flights from New Zealand began on 1 October. Between 29 December 1957 and 19 January 1958 T. L. Péwé and N. R. Rivard worked on glacial geology in the following areas: Taylor Dry Valley, Marble Point, Davis Valley, Hobbs Glacier, Garwood Valley, Miers Glacier, Heald Island, Black Island and Brown Island. Paleomagnetic investigations were carried out in a small dry valley south of upper Taylor Glacier and at Knobhead Mountain by Péwé and P. M. Smith in February. Between 2 and 22 January 1958 three stations in Victoria Land were occupied for glaciological, gravity and seismic observations: "Station A" in lat. 77° 33′ S., long. 158° 33′ W. at an elevation of 7750 ft. (2363 m.); "Station B" in lat. 77° 09′ S., long. 155° 05′ W., altitude 8300 ft. (2530 m.); and "Station C" in lat. 77° 22′ S., long. 139° 48′ E., altitude 8850 ft. (2698 m.). The observers travelled by aircraft. There are five scientists in the wintering party, led by G. A. Llano.

The runway on the fast ice broke away on 15 February 1958, but no aircraft were lost.

Marble Point. An ice-free runway, 1200 ft. (366 m.) long, the first in Antarctica, was constructed in October 1957 by twenty-seven men at Marble Point, a rock promentary about 4 miles (6 km.) north of Cape Bernacchi. The first aircraft landing was on 31 January 1958.

U.S.S.R.

The relief of the Soviet party was carried out by the *Ob'*, which left Kaliningrad on 27 September 1957 and arrived at "Mirnyy" on 18 November, and the *Kooperatsiya*, which left on 31 October and arrived on 31 December.

The new leader of the expedition in succession to A. F. Treshnikov is Ye. I. Tolstikov, with V. G. Kort in charge of the oceanographical work aboard the *Ob'*. The number of winterers in 1958–59 will be 180.

The first necessity at the start of the sledging season was to set up the station "Vostok" at the South Geomagnetic Pole. The previous season's attempt ended when the party stopped for the winter some 800–900 km. short, at a site called "Vostok-I".[1]

On 8 October a tractor train of six vehicles and twenty-seven men, led by Treshnikov, left "Mirnyy". Passing through "Pionerskaya" and "Vostok-I", where fuel and stores had been flown in, it pushed on to set up a new intermediate station, "Komsomol'skaya", on 6 November at about the same place as the station of the same name abandoned the previous season. Five men under V. Pelevin were left there, and "Vostok-I" was closed. On 11 November Treshnikov left "Komsomol'skaya", and after establishing a fuel depot 280 km. further south, reached the site for "Vostok" on 16 December. This was in lat. 78° 27′ S., long. 106° 52′ E., 1410 km. from "Mirnyy" and 3500 m. above sea-level. A party of eleven men under V. Sidorov was left here to man the new station, and the tractor train returned to "Mirnyy" on 31 December, having spent 85 days on the ice sheet and covered 3850 km.

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[1] See map, *Polar Record*, Vol. 8, No. 57, 1957, p. 539.

On 27 December a second tractor train of ten tractors and thirty-two men left "Mirnyy" to establish "Sovetskaya" in the Pole of Inaccessibility region. This group passed through "Pionerskaya" and "Komsomol'skaya", took stores to "Vostok", and then returned to "Komsomol'skaya" on 31 January 1958. Thence the train headed for the Pole of Inaccessibility, but it was found necessary to establish "Sovetskaya" some 600 km. short of the objective, in lat. 78° 24′ S., long. 87° 35′ E. at an altitude of 3700 m. Here six men under V. K. Babarykin remained to winter. It is hoped to reach the original objective in the 1958–59 season. "Pionerskaya" remained manned, as previously, with a wintering party of six.

Various new tracked vehicles were brought in by the relief ships. These included fifteen "S-100 A" tractors with superchargers for working at high altitudes, and some "Pingvin" amphibious vehicles.

The station "Oazis" was manned throughout the year. During the winter G. Pashchenko was in charge of the six men. In November 1957 a party of glaciologists and others arrived to continue detailed studies in the area. The new wintering party numbered eight.

The *Ob'* left "Mirnyy" on 10 January 1958 to start her oceanographical cruise in the Southern Ocean. A number of landings on the continent by light aircraft were made in King George V Land, Oates Land and elsewhere. Four meteorological rockets were launched from the ship as part of the I.G.Y. programme.

A bore-hole 370 m. deep was sunk into the ice in the "Mirnyy" area. Nineteen seismic soundings were obtained between "Mirnyy" and "Pionerskaya", mainly by refraction shooting, and showed ice thicknesses of between 400 and 2900 m. (1310 and 9510 ft.).

K. B. Mather, the leader of the Australian party at Mawson, visited "Mirnyy" by air from 4 to 10 September 1957, and P. G. Law called in *Thala Dan* from 31 January to 2 February 1958. The U.S. icebreaker *Burton Island* also called during the season. G. Cartwright, the United States Weather Bureau representative who had wintered at "Mirnyy", was relieved by M. P. Rubin.

The *Kooperatsiya* left "Mirnyy" with the first group of winterers due for relief on 10 January 1958. These were trans-shipped at Mauritius to the *Angara*, and the *Kooperatsiya* returned to "Mirnyy" for a second group, including Treshnikov, with whom she sailed on 14 February.

NEW ZEALAND GEOLOGICAL SURVEY EXPEDITION TO ROSS DEPENDENCY, 1957–58

[Summarized from information received from H. J. Harrington.]

Eight members of the New Zealand Geological Survey spent 7½ weeks during December 1957 to February 1958 in the area west and south of the joint United States–New Zealand I.G.Y. station at Cape Hallett, Ross Dependency. They were H. J. Harrington, leader; W. G. Croll, E. B. Fitzgerald, B. Hearfield, A. J. Heine, G. J. Lensen, I. C. McKellar, and B. L. Wood. The party left New Zealand on

20 November 1957 on U.S.S. *Atka*, transferred to U.S.S. *Glacier* at "Little America", and were flown in to Cape Hallett from McMurdo Sound on 16 and 17 December by United States aircraft. For the first two weeks they were accompanied by G. Turnbull of King's College, Newcastle, a paleomagnetist under contract to the United States I.G.Y. Committee.

Air photographs of the region showed a large valley glacier flowing into Tucker Inlet about 30 miles (50 km.) south of the station. They also showed what appeared to be a pass leading from "Hallett Bay", immediately north of Cape Hallett, to this glacier; it could, however, only be approached over sea ice. The expedition divided into two parties. One, of five men, went on a six-day geological trip north to Moubray Bay, to link up with the work done 50 years earlier by Borchgrevinck's and Campbell's parties at Cape Adare and Robertson Bay. The remainder crossed the sea ice and reconnoitred the 2000 ft. (610 m.) pass leading into the glacier above Tucker Inlet. This was found to be a feasible route and named "Football Pass"; a depot of food and supplies was made at the summit. This party also reconnoitred part of a high overland route back to the station from the pass, made a traverse around the shore in "Hallett Bay", measured a survey base line on the sea ice, established several survey stations on high points around the bay, and set out two lines of ablation and accumulation stakes on the glacier leading into "Hallett Bay". The expedition reassembled and reached the foot of the pass the day before the sea ice broke up in "Hallett Bay". The next four weeks were spent working up and down the glacier in two teams, one geological and one survey. At the furthest point reached, 66 miles (116 km.) from the pass and 80 miles (141 km.) from the sea, two peaks of about 9500 ft. (2896 m.) were climbed. The party returned over the Cape Hallett peninsula and reached the station on 8 February 1958. They were picked up by U.S.S. *Glacier* on the 19th and reached New Zealand on the 24th.

About twenty permanent survey stations were set up on points 3000 to 4000 ft. (920 to 1220 m.) above camps. The resulting maps will cover an area of roughly 6000 sq. miles (15,790 sq.km.), with a fairly high degree of accuracy in the central part of about 1500 sq. miles (3950 sq.km.).

The Robertson Bay beds of greywackes and angillites, first examined by Sir Raymond Priestley in 1911, were found to extend over nearly the whole of the northern part of Victoria Land, and possibly for several hundred miles further south to Skelton Glacier and beyond. It was also discovered that these beds extend not to the north-east but west-north-west in the same direction as the greywackes and argillites of Marie Byrd Land. This suggests that they run under the Ross Sea forming a geological link between East and West Antarctica.

THE TRANS-ANTARCTIC EXPEDITION, 1955–58: NEW ZEALAND PARTY, 1957–58

[Summarized from information from J. H. Miller and *Antarctic*, Vol. 1, No. 9, 1958.]

In addition to Sir Edmund Hillary's main southern journey to the South Pole, three notable sledge journeys were made in 1957–58 by members of the New Zealand party.

Northern Survey Party. This consisted of Lieut.-Commander F. R. Brooke, R.N., leader and surveyor, M. H. Douglas, guide, and two geologists, B. M. Gunn and G. Warren. The object of the journey was to carry out topographical and geological surveys of the area in Victoria Land west of McMurdo Sound, from Mawson Glacier in the north to the glacier above Mulock Inlet in the south, and to expand the work carried out in Skelton Glacier earlier in the year. The party, with two dog teams, left "Scott Base" on 4 October and worked for a week around Mount Newall, reaching

Cape Roberts on the 16th. A week was spent at Granite Harbour and then they worked north to Mount Gauss at Mawson Glacier. After a return to Cape Roberts the party worked from the coast to the plateau by way of the Debenham, Miller and McKay Glaciers and were resupplied by air on 1 December. They then moved north along the edge of the Prince Albert Mountains to the head of Mawson Glacier and returned to their depot on upper McKay Glacier on the 16th. From the 17th to the 29th they worked south along the edge of the mountains to the Lashly Mountains. Between 3 and 20 January 1958 they surveyed in the Skelton Glacier as far south as the divide with the glacier above Mulock Inlet, and returned to the Lashly Mountains. The next week was spent working west of the Royal Society Range and, on the 26th, Mount Huggins, 12,200 ft. (3720 m.), was climbed. The party moved down the Skelton Glacier between 27 January and 5 February and was returned by air to "Scott Base" the next day. In the 126 days of the journey about 1000 miles (1610 km.) had been covered and 45 survey stations kept, including 29 on mountain tops. About 20,000 sq. miles (5300 sq.km.) were surveyed.

The *Darwin* and *Southern Survey Parties* travelled together as a single unit of four dog teams as far as "Depot 480". They left "Scott Base" on 21 October 1957 and travelled ahead of Hillary's Southern Party up Skelton Glacier onto the plateau.

The *Darwin Survey Party*, H. H. Ayres and R. A. Carlyon, surveyor and geologist, left "Depot 480" on 7 December and travelled 76 miles east to a depot in lat. 79° 55′ S., long. 152° 30′ E. From the 13th to the 25th they worked north towards Mount Longhurst, returning to the depot on the 28th. On the 15th a dog team and sledge fell down a crevasse but was recovered with the loss of one dog. From 29 December to 6 January 1958 they worked southwards to the edge of the glacier entering Barne Inlet, and surveyed the area south of Mount Darwin, returning to depot on the 12th. There they were resupplied by air and joined by Flying Officer W. Cranfield and E. S. Bucknell. Between the 16th and the 21st the party journeyed down the glacier flowing past Mount Darwin to the Ross Ice Shelf and returned by air to "Scott Base" on 22 January. About 10,000 sq. miles (2650 sq.km.) were surveyed, topographically and geologically.

The Southern Survey Party consisted of J. H. Miller, leader, surveyor and geologist, and G. W. Marsh, physiologist. From "Depot 400" they continued in front of Hillary's party as far as "Depot 700", which they left on 19 December 1957. On the 25th they established a depot 92 miles to the south-east, and discovered two new mountain ranges running south-west from Mount Markham. They spent five days surveying on the more westerly of these ranges. The first week of the New Year was spent surveying south-east of Mount Markham and, until 9 January 1958, they worked south through the Queen Alexandra Mountains. Two days were spent surveying the southern extension of the newly discovered ranges and then the party began its homeward journey, reaching "Scott Base" on 23 February. The day before reaching "Scott Base" they were joined by Dr James Adam who carried out physiological studies on the two men. The journey of 1670 miles (2685 km.) is the longest sledge journey made in Antarctica, and, during it, 15,000 sq. miles (3950 sq.km.) were surveyed in the Queen Alexandra Range area.

NOTES

ARCTIC SEA ICE CONFERENCE, EASTON, MARYLAND, 1958

[By Terence Armstrong.]

The United States National Academy of Sciences—National Research Council convened a conference on Arctic sea ice at Easton, Maryland, on 25–27 February 1958. The conference was attended by over eighty participants from nine countries, and it was the first time that this subject had been discussed by so large and representative an international gathering.

Sessions were arranged as follows:

Distribution and character of sea ice

Chairman: Dr T. E. Armstrong (Scott Polar Research Institute, Cambridge)
- Distribution and character of sea ice in the European Arctic, by Dr F. Nusser (Deutsches Hydrographisches Institut, Hamburg)
- Classification of Arctic ice and its distribution in the Soviet sector of the Arctic, by A. A. Kirilov (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad)
- Present glacialization of the Arctic, by Professor G. A. Avsyuk (Institut Geografii, Moscow)
- An ice atlas of the North American Arctic, by Dr C. W. M. Swithinbank (Scott Polar Research Institute, Cambridge)

Sea ice observing and reporting techniques

Chairman: Dr Helge Thomsen (Dansk Meteorologisk Institut, København)
- The present situation of sea ice observation in Japan, by Professor K. Kusunoki (Institute of Low Temperature Science, University of Hokkaido)
- Arctic ice observational methods, by Professor A. F. Laktionov (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad)
- Sea ice observing and reporting technique in the Baltic, by Dr B. Rodhe (Sveriges Meteorologiska och Hydrologiska Institut, Stockholm)
- Aerial ice observing and reporting, by Dr H. V. French (U.S. Navy Hydrographic Office, Washington)
- The utilization of aerial photographs in sea-ice forecasts, by Dr G. Teleki (U.S. Navy Hydrographic Office, Washington)

Physics and mechanics of sea ice

Chairman: Dr E. R. Pounder (McGill University, Montreal)
- Preliminary results of thermal budget studies on arctic pack ice during summer, by Dr N. Untersteiner (University of Washington, Seattle)
- The structure of sea ice—a progress report, by Dr W. F. Weeks (Washington University, St Louis)

Physical and mechanical properties of arctic ice and methods of research, by I. S. Peschanskiy (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad)

Composition of sea ice and its tensile strength, by Dr A. Assur (Snow, Ice, and Permafrost Research Establishment, Wilmette, Illinois)

Studies on visco-elastic properties of sea ice, by Professor T. Tabata (Institute of Low Temperature Science, University of Hokkaido)

Model for determining sea ice properties, by D. L. Anderson (Geophysics Research Directorate, Boston)

Sea ice formation, growth and disintegration

Chairman: Professor G. A. Avsyuk (Institut Geografii, Moscow)

On the growth rate of sea ice, by Professor A. G. Kolesnikov (Moscow University)

Estimation of sea ice formation and growth, by Dr L. S. Simpson (U.S. Navy Hydrographic Office, Washington)

On the formation and growth of sea ice, by Professor T. Tabata (Institute of Low Temperature Science, University of Hokkaido)

Solar radiation as the chief component of the heat balance of the Arctic ice, by G. N. Yakovlev (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad)

Drift and deformation of sea ice

Chairman: Col. J. O. Fletcher (U.S. Air Force)

The movement of ice in the Arctic Ocean, by Miss I. M. Browne and A. P. Crary (Geophysics Research Directorate, Boston)

Arctic ice drift, by P. A. Gordiyenko (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad)

A theory on the steady drift of sea ice due to wind on the frozen sea, by T. Fukutomi (Institute of Low Temperature Science, University of Hokkaido)

Sea ice prediction techniques

Chairman: J. J. Schule, jr. (U.S. Navy Hydrographic Office, Washington)

Methods used in the ice service of the Baltic, by Dr E. Palosuo (Havsforskningsinstitutet, Helsingfors)

Continuity aids in short range ice forecasting, by W. I. Wittman (U.S. Navy Hydrographic Office, Washington)

In addition, the following papers were read outside the sessions listed above:

The Baltic Sea as an object of ice studies, with the Arctic Sea as a reference, by Dr I. Hela (Havsforskningsinstitutet, Helsingfors)

Economics of surface transportation in sea ice, by Rear-Admiral C. W. Thomas (U.S. National Committee for the I.G.Y., Washington)

Ice and the icebreaker: a study in types of ice encountered in icebreaker operations, by Capt. O. A. Peterson (U.S. Coast Guard, Cleveland)

The National Academy of Sciences hopes to publish the transactions of the conference later in the year.

TRANS-ARCTIC COMMERCIAL FLIGHTS, 1958

[From information provided by "Air France".]

On 10 April 1958 "Air France" began a regular trans-Arctic air service between Paris and Tokyo. The inaugural flight was made in the Lockheed L1649A Super Starliner *Frontenac*, commanded by Commander Cameille, which left Paris at 19.30 hr. G.M.T. on 10 April. The aircraft reached Anchorage, Alaska, at 12.37 hr. G.M.T., and refuelled there. It left Anchorage at 15.27 hr. G.M.T., now commanded by Commandant P. Wintersdorf, and reached Tokyo at 04.25 hr. G.M.T.

The service began with a single weekly flight each way.

THE KARA SEA ROUTE, 1953–57

[From information in *Lloyd's List and Shipping Gazette*, 1953–57.]

An account was given earlier[1] of activities on the Kara Sea Route between 1945 and 1952. The table below summarizes events of the subsequent five seasons. The object of all the voyages listed is to load timber at Igarka on the Yenisey and transport it to western Europe, or, in a few cases, to the Mediterranean. Only ships flying flags other than Soviet are included, because the movements of Soviet ships are not reported to Lloyd's. It is likely that a considerable number of Soviet ships are employed, mainly in taking cargo to other Soviet ports, and that the total number of voyages each year exceeds the figures shown by 50–100 per cent.

Year	No. of voyages	First arrival at Igarka	Last departure from Igarka
1953	22	About 23 July	30 September
1954	26	About 24 July	3 October
1955	32	23 July	8 October
1956	41	28 July	5 October
1957	37	25 July	5 October

DEFENCE RESEARCH NORTHERN LABORATORY, CHURCHILL, CANADA

[By A. M. Pennie, Superintendant, Defence Research Northern Laboratory, 1954–56.]

The Defence Research Northern Laboratory is part of the Joint Services Station at Churchill, Hudson Bay. It was established in 1947 by the Defence Research Board of Canada, and is one of eleven stations operated by that body. The United States authorities had developed Churchill in 1942 as a stage on a route for evacuation of war casualties from Europe, and a number of buildings and an airfield were taken over by the Joint Services Station when it opened in 1946. Churchill is the most northerly centre in Canada with year round railway service and has good harbour facilities for three months in the year.

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[1] *Polar Record*, Vol. 6, No. 46, 1953, p. 826–29.

The object of the laboratory is to study the effects of Arctic environment on the performance of men and materials in the field. Churchill is well situated for this purpose, being close to both bush and barren land. The original three huts were replaced by a permanent building in 1949, ~~to~~ which two wings were added in 1950 and 1952. Provision was made for the accommodation of a permanent scientific and administrative staff and visiting scientists, as well as laboratories, a library, workshops and stores. Members of the staff spend two to three years at Churchill.

Work has been carried out both in the station and by scientists taking part in army exercises. There has also been an army test team attached to the laboratory. The work has ranged over a large number of problems. These cover Arctic navigation, meteorology and environmental protection, including clothing and personal equipment, also field equipment. Physiological studies of diet, rations and fatigue; auroral research; and research into radio propagation in high latitudes have been carried out. Engineers have investigated the operation of heat pumps, observed the effect of cold on fuels, oils and lubricants, and tested cold weather engine starting aids. In addition to research projects the laboratory has been of considerable assistance to such agencies as Distant Early Warning Line contractors, visiting the Arctic for the first time.

Most of the research projects have been completed and the staff has been reduced. The main function of the laboratory is now to accommodate and assist visiting research and test teams. It is at present the headquarters of Canadian and United States International Geophysical Year teams.

THE "ELIASON" MOTOR TOBOGGAN

[By J. B. O'Neill, Canadian Topographical Survey.]

The Topographical Survey Division of the Department of Mines and Technical Surveys has been using the "Eliason" motor toboggan on winter control surveys in northern Canada for the past eight years and considers it to be the most suitable transport unit for the purpose and in the area concerned.

The most difficult winter travelling conditions encountered by the Division in Canada are along the tree limit extending from Labrador, across Quebec, Ontario and the northern parts of the prairie provinces to Alaska. Protected by the trees from drifting and packing, the extremely heavy snowfall in this belt lies soft and loose on the ground. When dogs are used in such conditions, it is necessary to break trail ahead of them with snowshoes, preferably a day ahead of the proposed trip. This is a slow and arduous task, making for much inefficiency in camp moves, and the Topographical Survey early recognized the need for a mechanical trail breaker. Snow vehicles of several types were examined and tested, and only the "Eliason" motor toboggan proved capable of carrying out the double task of trail breaking and load pulling in such conditions.

It is a single-track vehicle, mounted on two skis and powered by a 9 h.p. petrol engine. The dimensions are: length 7 ft. 9 in. (2·3 m.), width 2 ft. 9 in.

(0·8 m.), height 3 ft. (1 m.) and weight 4601 lb. (209 kg.). It has a maximum speed of 25 miles per hour, a fuel consumption of 25 miles per gallon and a towing capacity of 1000 lb., all depending on snow conditions. In towing capacity and general utility it is considered to be the equal of two teams of five dogs each. Loads are towed on toboggans constructed of four oak boards, each 9 ft. (3 m.) long and 8 in. (20 cm.) wide. Maintenance is simple. The motor is one cylinder, air cooled, with magneto ignition. The body is of laminated wood and steel. Broken skis, runners and seat frames can be replaced from wood available locally. Spare parts are small and compact and with experience it is now possible to estimate spare-part requirements accurately. As employed for survey work, a machine gives three or four years' service. The machine operates efficiently at temperatures of fifty or more degrees below zero.

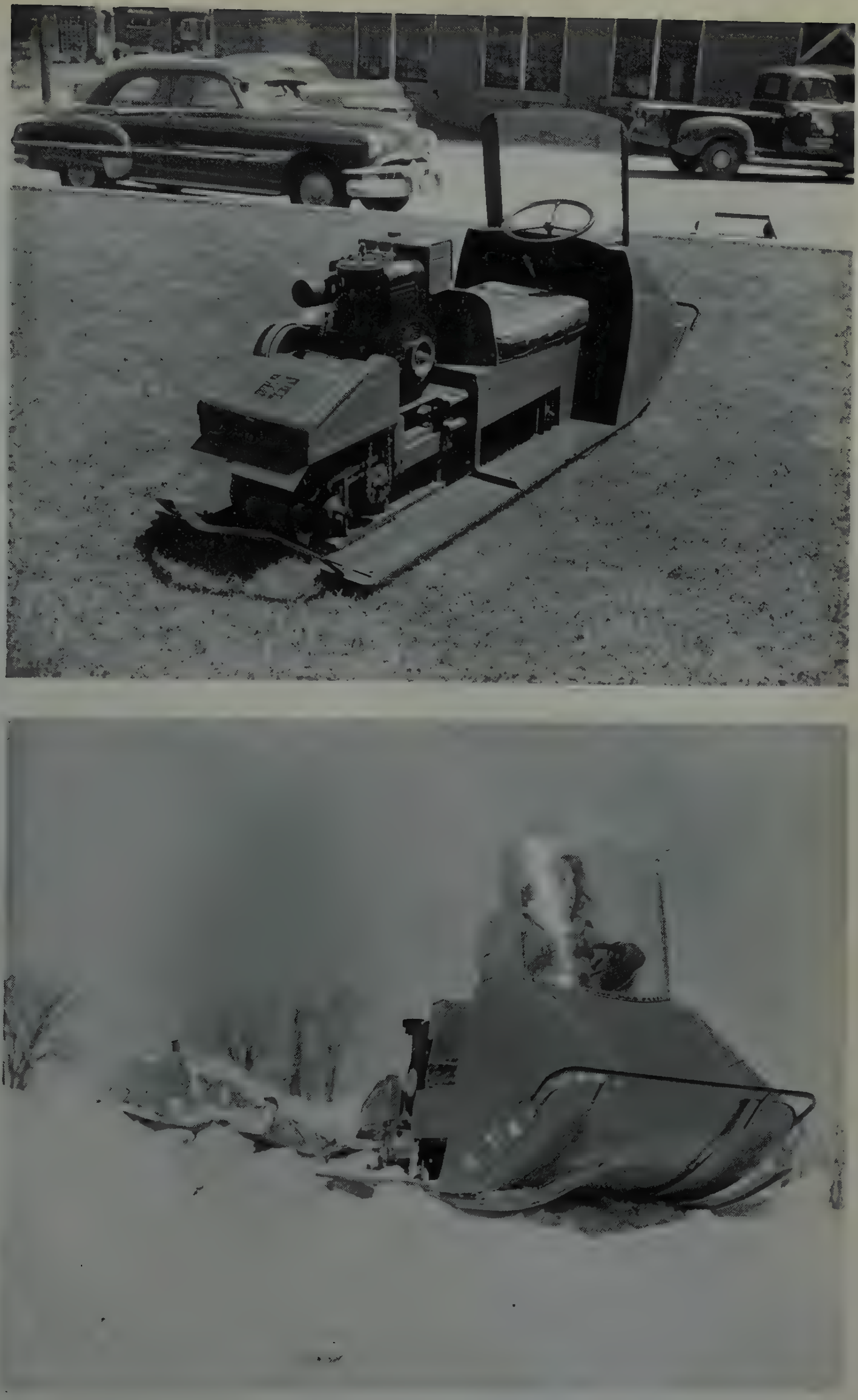
The main advantage of this vehicle is its lightness and ability to break trail through soft snow. It can also be used with safety on floating ice where bulldozers and similar heavy vehicles would be dangerous. Should it fall through the ice there is no cabin to impede the driver's escape, though at other times this lack of protection is a disadvantage. Another drawback is the tendency for the track and gears to become iced up in slush.

The "Eliason" motor toboggan has been proved satisfactory by the Topographical Survey in soft snow, but it should be equally efficient with hard snow.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS: SPECIAL COMMITTEE ON ANTARCTIC RESEARCH

At the International Council of Scientific Unions (ICSU) Antarctic meeting held in Stockholm on 9 to 11 September 1957 it was decided that there was need for further international organization of scientific activity in Antarctica, and that a committee should be set up for this purpose. The Bureau of ICSU invited the twelve nations actively engaged in Antarctic research to nominate a delegate each to a Special Committee on Antarctic Research (SCAR). Delegates were also invited from the International Union of Geodesy and Geophysics (IUGG), the International Geographical Union (IGU), the International Union of Biological Sciences (IUBS), the International Union of Pure and Applied Physics (IUPAP) and the Union Radio Scientific Internationale (URSI). The following permanent delegates were nominated: Argentina, Captain L. de la Canal; Australia, Professor K. E. Bullen; Belgium, Professor J. van Mieghem; France, Mons. B. Imbert; Japan, Professor T. Nagata; New Zealand, Dr E. I. Robertson; Norway, Professor L. Harang (also representing URSI); South Africa, J. J. Taljaard; United Kingdom, Dr G. de Q. Robin; United States, Dr L. M. Gould; U.S.S.R., Dr M. M. Somov; IUBS, Dr A. Brunn; IUGG, Ing. Gen. G. Laclavère; and IGU, Dr V. Schytt.

The first meeting of SCAR was held at The Hague from 3 to 6 February and all the participating nations and societies were represented except New Zealand and South Africa. Dr R. Fraser and Colonel E. Herbays represented the



‘Eliason’ motor toboggan

(*Facing p.* 268)

ICSU. The meeting elected Ing. Gen. G. Laclavère President, Professor K. E. Bullen Vice-President, and Dr V. Schytt Secretary. The main task of the committee at the first meeting was to "prepare a plan for the scientific exploration of Antarctica in the years following the completion of the International Geophysical Year programme". A Finance Committee was also formed. Three working groups were set up to discuss and prepare future research programmes and each later reported their recommendations to the Committee.

For the purposes of SCAR, Antarctica is defined as being bounded by the Antarctic convergence, and also including the sub-Antarctic islands on which International Geophysical Year observations are being made.

NEW RECORD LOW TEMPERATURE

[Summarized from *Soviet News*, 8 May 1958.]

The record low surface temperature of −102° F. (−74° C.), was set up at the "Amundsen–Scott" station at the South Pole on 17 September 1957, has been exceeded. At "Vostok" station a temperature of −113·3° F. (−80·7° C.) was recorded on 16 June, and at "Sovetskaya" station on 25 July 1958, one of −117·4° F. (−83° C.). Both these stations are about 1000 m. higher than the "Amundsen–Scott" station, and more distant from the sea.

CORRESPONDENCE

GERMAN METEOROLOGICAL ACTIVITIES IN THE ARCTIC, 1940–45

In going through some back issues of the *Polar Record* I came across a paper by J. D. M. Blyth, Vol. 6, No. 42, July 1951 on German meteorological activities in the Arctic, 1940–45. In the belief that such a document should be a factual record I would like to suggest the following.

The U.S.C.G.C. *Northland* is frequently referred to as an icebreaker. I commanded her from 1942–44 and she was an *iceworking* ship. Actually, she could not break her way out of a paper bag.

On p. 218 I offer the following: The landing force from the *Eastwind* (which I commanded from 1944–45) was one two-platoon company of 65 men and three officers (the ship carried 360 officers and men). While Karl Schmid valiantly attempted to destroy his classified documents, he did not succeed. Thereby we compromised the weather and submarine contact codes.

After capture of the meteorological team I maintained a search for the *Externstiene* (now the U.S.S. *Callo*) for nearly two weeks. She was captured by the *Eastwind* after which I manned her with a prize crew and stationed her on patrol outside the pack.

C. W. THOMAS
Rear-Admiral, U.S.N.

NATIONAL ACADEMY OF SCIENCES,
NATIONAL RESEARCH COUNCIL OF
UNITED STATES OF AMERICA
WASHINGTON

20 *March* 1958

OBITUARY

Leo Manning, widely recognized authority on the Eskimo language, died in March 1958 at Frobisher Bay, Baffin Island, at the age of 55. After serving for some years in the Hudson's Bay Company he joined government service as translator and interpreter in 1952. His ability to understand not only the Eskimo language but the people themselves, and to inspire them with complete trust, was of immense value in the Canadian Arctic. He had command of the dialects of both the Eastern and Western Arctic.

Joseph Burr Tyrrell died on 26 August 1957 at the age of 99. He graduated from Toronto University and joined the Geological Survey of Canada in 1881. For the next four years he explored and mapped the country north of Calgary and east of the Rocky Mountains, discovering dinosaur remains in Red Deer Valley on one of his journeys. During 1887–90 he surveyed some 25,000 sq. miles of western Manitoba, including the river system of Lake Winnipeg. In 1892 he was working in the area north of Churchill River, between Athabasca River and Reindeer Lake, when he heard from Indians of a great river flowing north from Lake Athabasca. The next year, with his brother and six canoe-men, he explored this river, the Dubawnt River, north to Dubawnt Lake and east to enter Hudson Bay at Chesterfield Inlet. The party, hampered by approaching winter, then had to travel 400 miles down Hudson Bay by canoe and 800 miles by snow-shoe and dog team before reaching railhead at Winnipeg. They arrived on 11 January 1894, over seven months after leaving Lake Athabasca. The following year Tyrrell returned to the same area and explored the Kazan lake system. In 1898 he was sent to Klondyke and the next year he resigned from the Survey. During his service he was responsible for the exploration and mapping of immense areas of northern Canada; he also produced the first report of the occurrence of oil near Edmonton.

He then became a consultant mining engineer, first in Dawson then in Toronto, finally taking to fruit farming when over 70 years of age. During his travels he made extensive natural history collections and published numerous papers on scientific and historical subjects.

RECENT POLAR LITERATURE

This bibliography has been prepared by R. J. Adie, Terence Armstrong, T. H. Ellison, Amorey Gethin, J. W. Glen, W. B. Harland, H. G. R. King, Brian Roberts and Ann Savours. Its main field is the polar regions, but it also includes other related subjects such as "applied" glaciology (e.g. snow ploughs and ice engineering). For the literature on the scientific study of snow and ice and of their effects on the earth, readers should consult the bibliographies in each issue of the *Journal of Glaciology*. For Russian material, the system of transliteration used is that agreed by the U.S. Board on Geographic Names and the Permanent Committee on Geographical Names for British Official Use in 1947 (see *Polar Record*, Vol. 6, No. 44, 1952, p. 546). For reasons of economy it has been possible to print only a selection of the total literature. A classified bibliography is maintained at the Scott Polar Research Institute which is at the disposal of all readers.

Reprints of "Recent Polar Literature" from Nos. 37/38 onwards, can be obtained separately (to allow references to be cut out for pasting on index cards) from the Institute, price 2*s*. 6*d*. for two reprints. Copies will be sent without charge to organizations with which the Institute maintains exchange arrangements and which notify their wish to receive them. Readers can greatly assist by sending copies of their publications to the library of the Institute.

To increase the usefulness of the bibliography entries have been arranged provisionally under subject headings in classified order according to the Universal Decimal Classification. When circumstances permit the decimal notation will be included, together with a key.

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ERRATA

The *Polar Record*, No. 57, September 1957

Page 526, lines 15 and 16. *Delete* a new station on the west coast of

Page 528, line 1. *Delete* new

Page 528, line 16. *For* Montague *read* Montagu

Page 529, line 21. *Delete* new

Page 530, line 3. *For* Adresen Island *read* Andresen Island

Page 530, lines 3 and 4. *Delete* Some...plateau. *and substitute* During September T. L. Murphy, R. Miller and M. J. H. Orford found and surveyed a good route to the plateau; part of the east coast of Lallemand Fjord was also surveyed. [Ignore correction in *Polar Record*, No. 58, 1958, p. 85, line 22.]

Page 530, line 5 to line 8. *Delete* 6 October...Wright *and substitute* 13 October they returned to Roux Island and found that the break-up of the sea ice prevented their return to Detaille Island. A relief party, R. Miller and D. P. Moore, joined them by boat but were unable to return owing to weather conditions. Wright and Miller returned to Detaille Island on skis on 3 November, but Thorne and Moore with the dogs.

Page 531, line 17. *Delete* New Station,* [subsequently named Arthur Harbour].

The *Polar Record*, No. 58, January 1958

Page 13, line 27. *For* Börgen *read* Borge

Page 14, line 25. *For* re-mapped *read* mapped

The *Polar Record*, No. 59, May 1958

Page 102, line 12. *For* at *read* near

Page 105, line 38. *For* Capt. *read* Robert

Page 106, line 39. *For* reaching Nantucket in June *read* but found no Fur Seals

Page 106, line 45. *After* 1821 *insert* , reaching Nantucket in June

Page 108, line 17. *For* Capt *read* J.

Page 122, line 6. *For* Capt *read* Kapt.

Page 158, line 29. *For* −3° C. *read* 15° C.

Page 158, line 30. *For* 22° C. *read* 40° C.

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